This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

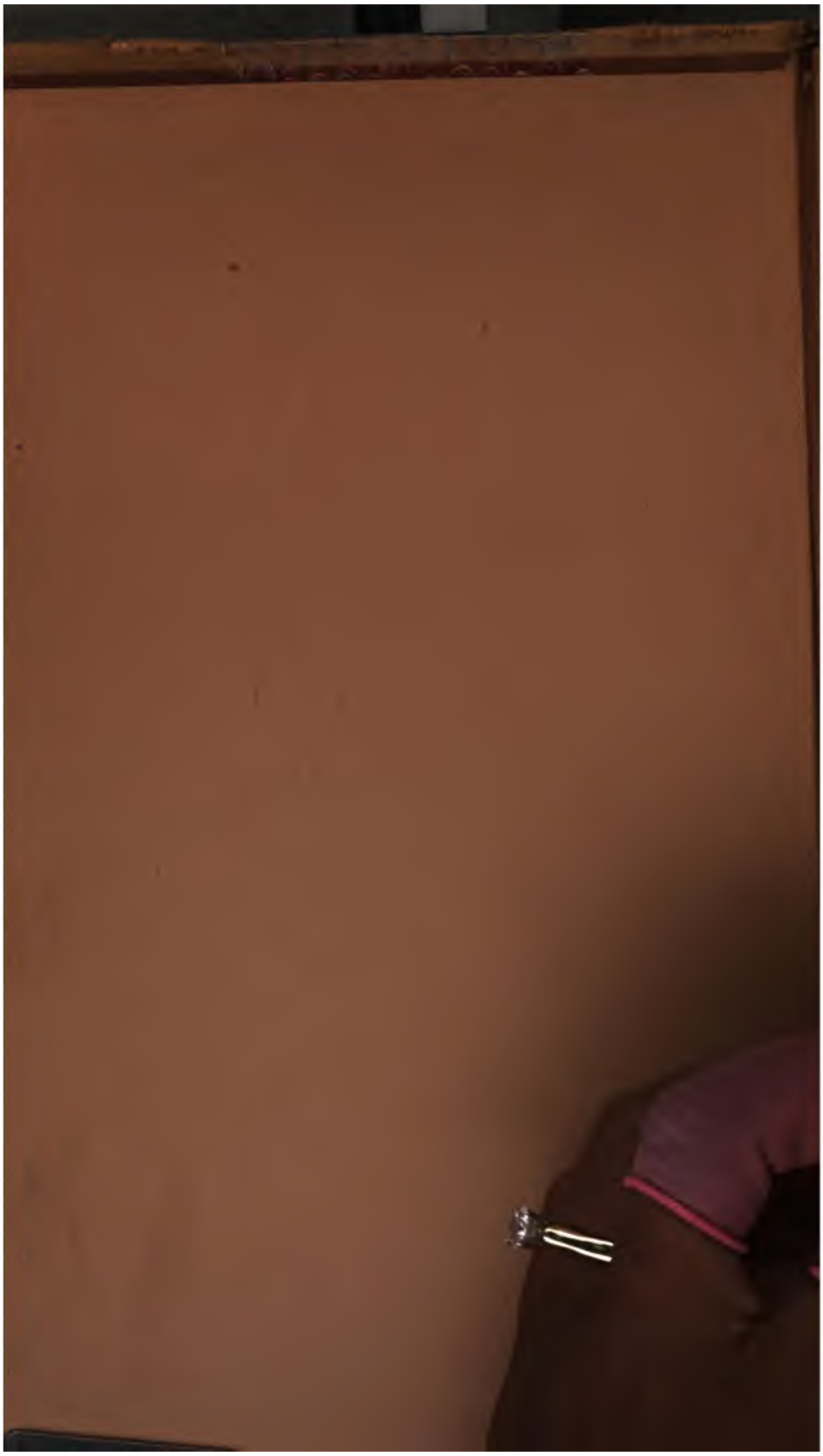
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

507 .U58 NO.29 C.1
Results of ornithologi
Stanford University Libraries
3 6105 046 412 966

LIBRARY OF THE
Leland Stanford Junior University



48

Department of the Interior:

U. S. NATIONAL MUSEUM.

LELAND STANFORD JUNIOR UNIVERSITY
DEC 23 1891
LIBRARY

BULLETIN

OF THE

NITED STATES NATIONAL MUSEUM.

No. 29.

RESULTS OF ORNITHOLOGICAL EXPLORATIONS IN THE COMMANDER ISLANDS AND KAMTSCHATKA.

BY

LEONHARD STEJNEGER.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

Department of the Interior:
U. S. NATIONAL MUSEUM.

— Serial Number 39 —

BULLETIN

No. 29

OF THE

UNITED STATES NATIONAL MUSEUM.

PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

LELAND STANFORD JUNIOR UNIVERSITY
LIBRARY
A11433

ADVERTISEMENT.

This work (Bulletin No. 29) is the thirty-ninth of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

The publications of the National Museum consist of two series—the Bulletins, of which this is No. 29, in continuous series, and the Proceedings, of which the eighth volume is now in press.

The volumes of Proceedings are printed, signature by signature, each issue having its own date, and a small edition of each signature is distributed to libraries promptly after its publication.

From time to time the publications of the Museum which have been issued separately are combined together and issued as volumes of the Miscellaneous Collections. These are struck off from the stereotype plates from which the first edition was printed, and in this form are distributed by the Smithsonian Institution to libraries and scientific societies throughout the world. Volume 13 of these collections includes Bulletins 1 to 10 inclusive; volume 19, volumes 1 and 2 of the Proceedings; volume 22, volumes 3 and 4 of the Procedings; and volume 23, Bulletins 11 to 15 inclusive.

Full lists of the publications of the Museum may be found in the current catalogues of the publications of the Smithsonian Institution.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, August 20, 1885.

RESULTS

OF

ORNITHOLOGICAL EXPLORATIONS

IN

THE COMMANDER ISLANDS AND IN KAMTSCHATKA.

BY

LEONHARD STEJNEGER.

WITH NINE PLATES.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

A114433

PREFATORY NOTE.

The following work has been divided into three parts: (1) a review of the species of birds collected or observed by me on the Commander Islands and at Petropaulski, Kamtschatka; (2) a synopsis of the birds reported to inhabit Kamtschatka, and (3) conclusions. The first and third parts are eminently the "results of my explorations", while the second part is more the "results of my investigations"; however, as it is a necessary base for the "conclusions" it has been thought desirable to incorporate it, the more so since it is the first attempt of a complete list of the birds known to have been observed in Kamtschatka.

The systematical nomenclature will be found to deviate not inconsiderably from the one usually adopted in the publications treating of the region in question. The reason is a two-fold one, for in *identifying* the birds I have been anxious not to lump together nearly-related forms, representative species, subspecies, local races, migrating-route races, or whichever they are termed, giving the separation the benefit of the doubt whenever there be a doubt, it being my scientific creed that this is the least harmful course. In *naming* the forms thus identified I have strictly adhered to the rules laid down by the "American Ornithologists' Union." For changes in nomenclature of that origin I am, therefore, only partly responsible, and eventual critics should not charge against me "the pleasure of bringing forward" these changes, which are the necessary results of the consistent application of the only sound principle upon which a scientific nomenclature can be based. The systematical arrangement is that which I proposed in "Science Record" 1884, p. 155, with a few modifications.

The measurements are given in millimeters. The "total length" is measured by laying the fresh bird on its back on the table in a natural position without stretching its neck, marking the tips of the bill and of the tail on the table, and measuring the distance between the two points. The length of the "tail feathers" is given instead of that of the "tail," the measure being taken by thrusting one arm of the dividers between the two central tail-feathers to their insertion, measuring from that point to

the tip of the longest rectrix. The other dimensions have all been taken with sharply-pointed dividers, the arms of which were about 150^{mm} long; dimensions too long to be measured with those were taken by a steel tape measure.

Careful attention has been given to the color of the soft parts which have been recorded only when they could be described from the perfectly fresh bird, and were invariably noted down before skinning it.

Whenever the sex is recorded it has been determined anatomically by myself, except in a few cases where it was determined in a similar way by others, in which case it has been included in parenthesis. In no instance is the sex given from external characters.

For some species a full synonymy has been given, but in most cases only such authors are quoted who have treated of the birds of Kamtschatka and surrounding regions, both on the Asiatic and the American side, directly and particularly. References to general works are therefore only seldom met with. Whenever it has been impossible for me personally to verify a quotation the number of the page has been given in parenthesis. In most cases these have been compared with the citations of several authors, but the present writer disclaims any responsibility for figures thus designated, seeing how generally errors are perpetuated and dispersed by copying references without verifying them.

I have to acknowledge thankfully the aid I received from every person with whom I came into contact during my explorations in that remote corner of the world. It is especially a pleasure to me to mention the many valuable additions to my collection kindly placed in my hands by Governor N. Grebnitski, who, not only during my sojourn on the islands, assisted me in every possible way, but also later sent me a fine series of birds brought together during the year 1883–'84. Captain Hunter, an American gentleman, now residing in Petropaulski, also presented me with a box containing Kamtschatkan birds, and to Mr. John Malavanski my thanks are due for kind assistance in procuring specimens from the neighborhood of Petropaulski while I was away on the islands. To Mr. Carl Osche's skill as a hunter many of the rarer specimens are due, and many of the natives took pride and pleasure in bringing me desirable objects. The officers of the steamer "Alexander", belonging to Messrs. Hutchinson, Kohl, Philippeus & Co., as also the agents of this firm, did all in their power to insure my success. It may also be but just to mention the benefit I derived from Dr. Dybowski's suggestions and communications during the first summer.

I.—REVIEW OF THE SPECIES OF BIRDS COLLECTED OR OBSERVED BY ME ON THE COMMANDER ISLANDS AND AT PETROPAULSKI, KAMTSCHATKA, 1882-1883.

the tip of the longest rectrix. The other dimensions have all been tak
with sharply-pointed dividers, the arms of which were about 150mm lon
dimensions can thus be measured with those were taken by a st
rule or scale.

Special attention has been given to the color of the soft parts whi
have been recorded only when they could be described from the p
fresh birds, and were accurately noted down before skinning it.

Whenever the sex is recorded it has been determined anatomica
by myself, except in a few cases where it was determined in a simil
way by others, in which case it has been included in parenthesis.
no instance is the sex given from external characters.

For some species a full synonymy has been given, but in most cas
only such authors are quoted who have treated of the birds of Ka
selection and surrounding regions, both on the Asiatic and the Ame
can soils, directly and particularly. References to general works a
therefore only seldom met with. Whenever it has been impossible f
me personally to verify a quotation the number of the page has be
given in parenthesis. In most cases these have been compared wi
the citations of several authors, but the present writer disclaims a
responsibility for figures thus designated, seeing how generally erro
are perpetuated and dispersed by copying references without verifyi
them.

I have to acknowledge thankfully the aid I received from every pe
son with whom I came into contact during my explorations in that r

[redacted]

I.—REVIEW OF THE SPECIES OF BIRDS COLLECTED OR OBSERVED BY ME ON THE COMMANDER ISLANDS AND AT PETROPAULSKI, KAMTSCHATKA, 1882-1883.

Order CECOMORPHÆ.

Superfamily COLYMBOIDEÆ.

Family COLYMBIDÆ.

1. Colymbus holbœllii (Reinhardt).

1827.—*Podiceps rubricollis* Bonap., Spec. Comp., p. 75 (*nec* Gmel, 1788).—Swinh., P. Z. S., 1863, p. 322.—Blakist. & Pryer, Tr. As. Soc. Jap., X, 1882, p. 93.—Blakist., Amend. List B. Jap., p. 23 (1884).

1849.—*Podiceps rubricollis major* Temm. & Schleg., Faun. Jap. Av. (pl. 78 B), (*nec P. major* (Bodd.), 1783).—*P. suboristatus* var. *major* Dybow., J. f. Orn., 1868, p. 339.

1853.—*Podiceps holbœllii* Reinhardt, Vidensk. Meddel., 1853 (p. 76).—Nelson, Cruise Corwin, p. 114 (*polbölli* / err. typ.) (1883).

1858.—*Podiceps grisegena* Lawr., in Baird's B. N. Amer., p. 892 (*nec* Bodd., 1783).—Dall and Bannist., Tr. Chicag. Acad., I, 1869, p. 308.—Finsch, Abh. Brem. Ver., III, 1872, p. 76.—Coues, in Elliott's Aff. Alaska, p. 201 (1875).—Elliott, Monogr. Seal Isl., p. 133 (1882).

1858.—*Podiceps cooperi* Lawr., in Baird's B. N. Amer., p. 893.—Finsch, Abh. Brem. Ver., III, 1872, p. 75.

1858.—*Podiceps suboristatus* Kittl., Denkw., II, p. 313 (*nec* Jacq., 1784).—Schrenck, Reis. Amurl., I, p. 493, pl. 15, fig. 3 (1860).—Radde., Reis. Süd. Ost- Sibir., II. (p. 381) (1863) —Przew., Putesch. Ussur. (*n.* 219) (1870).

1866.—*Podiceps affinis* Salvadori, Atti Soc. Ital. Sc. Nat., VIII, 1866 (p. 45).

1874.—*Podiceps cucullatus* Taczan., J. f. Orn., 1874, 336 (*nec* Pall. 1826).—*Id.*, *ibid.* 1875, p. 257.—*Id.*, *ibid.*, 1876, p. 203.—*Id.* Orn. Faun. Vost. Sibir., p. 72 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 49.—*Id.*, *ibid.*, 1883, p. 245.

The large Eastern Asiatic representative of *Colymbus grisegena* Bodd. is usually designated by the name *C. cucullatus* Pall.* An examination of Pallas's account of the latter in his Zoographia Rosso-Asiatica, renders plain that he only had the European and West Siberian form before him, and that consequently the name becomes only a synonym of *grisegena* proper.

In the first place about the habitat. He says: "In Rossiæ et Sibiriæ

* Taczanowski writes persistently "*P. cucullatus* Lath." I have not been able to find such a name in Latham's writings.

lacubus non infrequens, præsertim per campos Ischimenses et Barabenses copiosior. Borealiores regiones vix videtur adire." No special mention is made of its occurrence in Eastern Asia, and to any one familiar with Pallas's work and the explicit way in which he describes the habitat of birds also found in that region the above reference is ample proof that Pallas did not know of its occurrence in Eastern Siberia. The description of the colors applies just as well to one form as to the other, and needs therefore no further consideration. But not so the measurements. He gives the total length as 15 inches 7 lines, wing as 6 inches 7 lines, tarsus 1 inch 9 lines, outer toe 2 inches 8 lines; while the eastern form has these corresponding dimensions, 20 inches, nearly 8 inches, 2½ inches, and 3 inches, while his measurements agree closely with those of European birds. The length of "rostrum" is given as 2 inches, which probably means the length along the commissure, which in the eastern form is more than 2½ inches long.

This disposes of Pallas's *cucullatus*.

Mr. Severzow suggests that the so-called *C. longirostris* Bp., of which specimens are known from Italy, may possibly belong to the East-Asiatic form, having straggled as far as Italy. Th. Salvadori has left us a good account of a specimen of the Italian bird accompanied by measurements. (Catal. Ucc. Sardegna, p. 136, Milan, 1864.) Judging from what he says, the Mediterranean form must be something entirely different, however.

In the first place he describes the bill as different from that of *grisegena* by being recurved like that of "*P. auritus* LATH." * "verso l'apice rivolto in alto come nel P. a,") a feature not at all shared by the East Siberian form. Finally his measurements indicate quite different proportions. With a bill of excessive length it combines general dimensions inferior to those of the eastern form, although somewhat larger than the common European bird, as a comparison of his measurements, as given below, with those of eastern birds in the appended table of dimensions clearly proves. Here are the measurements of the specimens in the museum at Cagliari as given by Salvadori: Commissure, 88^{mm}; exposed culmen, 76^{mm}; from tip of bill to anterior border of nostrils, 63^{mm}; tarsus, 60^{mm}; outer and middle toes, 72^{mm}; wing, 180^{mm}. The name *C. longirostris* Bp. is not tenable, however, as the Sardinian bird certainly is distinct from Bonnaterre's *C. longirostris* of 1790 (Enc. Meth. Orn.,

*Neo LIN. Is the same as *Colymbus nigricollis* BREHM.

I, p. 54), which, having a bill "*d'environ deux pouces*," cannot be anything but the common European form. In that case it will be necessary to give the Sardinian bird a new name. It might fitly be called *Colymbus salvadorii*.*

A comparison of my specimen from Eastern Asia with a good series of typical *grisegena* from Europe and typical *holbœllii* from North America has convinced me that they really belong to the latter form. My material indicates no intergradation, and none has been reported so far as I know, so that a trinominal like *Colymbus grisegena holbœllii* seems totally unwarranted for the present at least.

In my private collection is a specimen collected by Dr. Dybowski, at the Bay of Abrek, Premorskoj Government, Eastern Siberia, of which measurements are included in the appended table:

Table of measurements.

Collection.	Museum No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Exposed culmen.	Commissure.	Tarsus.	Outer toe with nail.
				1882.		*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
U. S. Nat. Mus ...	92918	1752	Bering Island	Nov. 24	♀	462	.....	.....	.....	.....	.....
				1875.							
Stejneger	707	.....	Bay of Abrek	June 23	♂ ad.	(522)	208	48	68	67	76

No. 92918.—Iris, light orange yellow; bill, greenish yellow, at base tinged with reddish brown; culmen and nasal fossæ blackish brown, becoming paler toward the tip; naked skin of mental angle greenish yellow. Inner aspect of feet greenish yellow, shaded with dark on the joints; lobes orange-colored next to the toes; outer aspect, and toes below, blackish. Stomach filled with a green mass, chiefly consisting of feathers, however.

The Great Red-necked Grebe does not appear at the islands, except as a rare straggler. A single specimen was taken at Saranna, Bering Island, late in November, 1882.

---

* The synonymy of the typical *Colymbus grisegena* will stand as:

1763.—*Colymbus grisegena* BODD., Tabl. Pl. Enl., p. 55 (Ed. Teget.).
1784.—*Colymbus suberistatus* JACQ., Beitr. Gesch. Vög., p. 87.
1786.—*Colymbus parotis* SPARRM., Mus. Carls. (pl. 9).
1787.—*Podiceps rufficollis* LATHAM, Syn. Suppl., I, p. 294.
1788.—*Colymbus rubricollis* GMEL., Syst. Nat., I, 2, p. 592.
1790.—*Colymbus longirostris* BONNAT., Enc. Meth Orn., I, p. 54 (*nec* BP.).
1826.—*Colymbus cucullatus* PALL., Zoogr. Ross. As., II., p. 355.
1831.—*Podiceps canogularis* BREHM, Handb. Vög. Deutschl., p. 958.

2. Colymbus auritus LIN.

1758.—*Colymbus auritus* LIN., Syst. Nat., 10 ed., I, p. 135.—*Podiceps a.* WHITELY, Ibis 1867, p. 209.—*Dytes a.* NELSON, Cruise Corwin, p. 114 (1883).

1788.—*Colymbus cornutus* GMEL., Syst. Nat., I, p. 591 (*nec* PALLAS, 1826).—*Podiceps c.* MIDDEND., Sibir. Reis., II, 2 (p. 238), (1853).—SCHRENCK, Reis. Amurl., I., p. 492.—RADDE, Reis. Süd. Ost-Sibir., II (p. 381).—SWINH., P. Z. S., 1863, p. 322.—*Id., ibid.*, 1871, p. 415.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 308.—FINSCH, Abh. Brem. Ver., III, 1872, p. 76.—TACZAN., J. f. Orn., 1873, p. 1108.—*Id., ibid.*, 1874, p. 336.—*Id., ibid.*, 1876, p. 203.—*Id.*, Orn. Faun. Vost. Sibir., p. 72 (1877).—*Id*, Bull. Soc. Zool. France, 1877, p. 49.—BLAKIST. & PRYER, Ibis, 1878, p. 211.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 181.—*Iid., ibid.*, X, 1882, p. 92.—SEEB., Ibis, 1879, p. 21.—*Id., ibid.*, 1882, p. 369.—HARTLAUB, J. f. Orn., 1883, p. 284.—BLAKIST., Amend. List B. Jap., p. 8 (1884).

The Horned Grebe is of rare occurrence on the islands, probably only an accidental straggler and not a regular migrant. It certainly does not breed there anywhere. The only evidence of its occurrence which I possess is a skeleton which one of the natives had made several years ago from a specimen obtained at Bering Island.

This specimen, No. 17273 of the osteological collection of the United States National Museum (L. Stejneger, No. 1952) measures as follows: Bill along commissure, 29^{mm}; tarsus, 43^{mm}.

Superfamily ALCOIDEÆ.

Family URINATORIDÆ.

3. Urinator adamsii (GRAY).

1835.—*Colymbus glacialis* ROSS, Narr. Voy. N. W. Pass., p. — (*nec* LIN.).—MIDDEND., Sibir. Reis., II, 2, p. 238 (*part*).

1836.—*Colymbus hiemalis* WIEGM., Arch. Naturg., 1836, p. 200 (*nec* BREHM).

1859.—*Colymbus adamsii* G. R. GRAY, P. Z. S. 1859, p. 167.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 308.—FINSCH, Abh. Brem. Ver., III, 1872, p. 72.—SWINH., Ibis, 1877, p. 146.—SEEB., Ibis, 1879, p. 22.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 181.—*Iid., ibid.*, X, 1882, p. 94.—NELSON, Cruise Corwin, p. 114 (1883).—TACZAN., Bull. Soc. Zool. France, 1883, p. 345.—BLAKIST., Amend. List B. Jap., p. 33 (1884).

1872. —*Colymbus torquatus* var. *adamsii* COUES, Key, p. 334.

The White-billed Loon is a winter visitor to the Commander Islands of rather rare occurrence, but at least one was observed by me, apart from the one specimen I obtained for my collection.

This was caught in a rather curious manner. It was found sitting on the smooth ice of Lake Saranna (November 25, 1882), unable to run upon or lift from the glib surface. It evidently had mistaken the transparent and shining ice for open water.—Ritter v. Tschusi-Schmidhofen re-

lates a similar mistake on the part of a flock of coots, *Fulica atra* L. (Cf. Journ. f. Orn., 1874, p. 343).

This species is distinguished by the natives from the following as "Bolschoj Gagara."

The specimen measures as follows:

♀ jun. U. S. Nat. Mus., No. 92916; L. Stejneger, No. 1753. Bering Island, November 25, 1882.

Total length, 777mm; wing, 355mm; tail-feathers, 65mm; exposed culmen, 71mm; commissure, 102mm; bill from tip to posterior border of nostrils, 62mm; height of bill at fore border of nostrils, 22mm; tarsus, 90mm; outer toe, with claw, 121mm. Weight, 5¼ pounds.

Remarks.—Iris brown. Bill light bluish gray, towards base somewhat violet; culmen and tomia blackish. Outer aspect of feet blackish brown; inner aspect bluish white, with dark brownish gray on the joints, on the two inner phalanges of the outer toe, and on the webs along the outer and middle toes.

The stomach did not contain anything but half a dozen stones of the size and shape of beans.

The specimen is a bird of the year, but can nevertheless, without doubt, be referred to *adamsii*. In the adult winter-plumage this species and *imber* are readily distinguishable by the bill, which in the latter is shorter than the tarsus, while in the former it is longer. This cannot be done so easy in the young of the year, however, as at that age the bill has not yet reached its full and final length. The feet, on the other hand, are already of the same size as those of the adult, while the height of the bill is also much greater than in the corresponding age of *imber*, so that the young *adamsii* may be identified by the very large feet and the high bill, features which are very pronounced in the specimen collected by me. The average length of the tarsus in *adult imber* measures about 78mm; the same dimension in my young bird is 90mm; in the former the average length of the outer toe with claw is 111mm, against 121mm in the Bering Island specimen. As to the young of *imber* the height of the bill is about 16 to 18mm, against 22mm in my bird, which in that respect even exceeds the old *U. imber*.

4. Urinator lumme (GUNN.).

1761.—*Colymbus lumme* GUNN., Act. Nidr. I, pl. ii, fig. 2.—*Urinator l.* TURNER, Auk, 1885, p. 159.

1764.—*Colymbus stellatus* BRÜNN., Orn. Bor., p. 39.

1764.—*Colymbus borealis* BRÜNN., Orn. Bor., p. 39.

1766.—*Colymbus septentrionalis* LIN., Syst. Nat., 12 ed., I, p. 220.—MIDDEND., Sibir. Reis. II, 2 (p. 329), (1853).—KITTL., Denkw., II, p. 282, (1858).—SCHRENCK, Reis. Amurl., I, p. 496, (1860).—RADDE, Reis. Süd. Ost-Sibir., II, (p. 382), (1863).—SWINH., P. Z. S., 1863, p. 322.—*Id.*, *ibid.*, 1871, p. 415.—*Id.*, Ibis, 1863, p. 433.—*Id.*, *ibid.*, 1874, p. 163.—WHITELY, Ibis, 1867, p. 208.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 307.—FINSCH, Abh. Brem. Ver., III, 1872, p. 75.—DALL, Avif. Aleut. Isl. west Unal., p. 10 (1874).—TACZAN.,

Orn. Faun. Vost. Sibir., p. 73 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 50.—*Id.*, *ibid.*, 1882, p. 398.—BLAKIST. & PRYER, Ibis, 1878, p. 211.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 181.—*Id.*, *ibid.*, X, 1882, p. 94.—NELSON, Cruise Corwin, p. 115 (1883).—HARTLAUB, J. f. Orn., 1883, p. 284.—BLAKIST., Amend. List B. Jap., p. 8 (1884).—*Cepphus s.* PALLAS, Zoogr. Ross. As., II, p. 342 (1826).—*Eudytes s.* NORMANN, in Erman's Verzeichn. Thier. Pflanz., p. 18 (1832).

1774.—*Colymbus glacialis* Phippe, Voy. North Pole, p. — (*nec* LIN.).—SWINHOE, Ibis, 1860, p. 67.— *Id.*, *ibid.*, 1861, pp. 268, 345, 410.

1783.—*Colymbus immer* BODD., Tabl. Pl. Enl., p 58 (Ed. Teg.) (*nec* BRÜNN., 1764).

1788.—*Colymbus striatus* GMEL., Syst. Nat., I, 2, p. 586.

1810.—*Colymbus rufogularis* MEY. & WOLF, Taschb. Deutsch. Vogelk., II, p. 453.

1826.—*Colymbus müllerí* BREHM, Isis, 1826, p. 984.

1831.—*Colymbus stellaris* LESSON, Traité d'Orn., p. 637.

1855.—*Colymbus microrhynchos* BREHM, Naumannia, 1855, p. 300.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Expos. culmen.	Tarsus.	Outer toe with claw.	Total length.
				1882.	mm.	mm.	mm.	mm.	mm.	mm.
89118	1147	♀ad.	Bering Island	June 3	155	48	50	72	88	605
92917	1398	juv.	do	Aug. 5	.....	.....	.....	.....	.....	480

No. 89118.—Iris reddish brown. Bill black, culmen yellowish gray, lighter towards the base.

No, 92917.—Iris dark hazel. Bill light bluish gray, culmen blackish. Feet bluish white; outer aspect, webs along the toes, and joints blackish.

The "*Gagara*" occurs very abundantly on Bering Island during the summer. Even on very small ponds a breeding pair is regularly found, and on the greater lakes several pairs take up their quarters, not in company, however, but each pair by itself, occupying its own corner of the lake.

On Copper Island suitable localities are very scarce, but in a few places they breed, nevertheless. Thus, on July 30, 1883, I found a pair at Pestschanoj Ozero, a few miles from the village.

They appear in spring rather late, as the first ones were observed about the 1st of May, the bulk not arriving before the 7th (1883). Fresh eggs were taken on June 2, 6, and 21. These measure as follows:

U. S. Nat. Mus. No.	Stejn. No.	Lg. diam.	Sh. diam.
		mm.	mm.
21778	1146	77.5	46
21779	2195	76	46
21780	2196	72	47

Family ALCIDÆ.

5. Uria lomvia arra (PALL).

1822.—*Uria brunnichii* CHORIS, Voy. Pittor., Aléout., pl. xxi (*nec* SAB.)—BLAKIST. & PRYER, Ibis, 1878, p. 211.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 180.—*Id.*, *ibid.*, X, 1882, p. 91.—SEEB., Ibis, 1882, p. 369.—BLAKIST., Amend. List B. Jap., p. 32.

1826.—*Cepphus arra* PALL., Zoogr. Ross. As. II, p. 347.—*Uria a.* CASSIN, Pr. Philada. Acad., 1862, p. 324.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 309.—TACZAN., Bull. Soc. Zool. France, 1882, p. 398.—STEJNEGER, Naturen, 1884, p. 54.—*Lomvia a.* COUES, in Elliott's Aff. Alaska, p. 211.—ELLIOTT, Monogr. Seal Isl., p. 135 (1882).—NELSON, Cruise Corwin, p. 117 (1883).

1826.—*Cepphus lomvia* PALL., Zoogr., Ross. As., I, p. 345 (*part*).—TACZAN., Orn. Faun., Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.

1832.—*Uria troile* KITTL., Isis, 1832, p. 1104 (*nec* LIN.).—*Id.*, Denkw., I, p. 302; II, p. 224 (1858).—FINSCH, Abh. Brem. Ver., III, 1872, p. 78.

1884.—*Uria lomvia arra* RIDGW. in B. Br. & Ridgw. Water B. N. Amer., II, p. 485.—TURNER, Auk, 1885, p. 159.

Dr. Coues, in his Monograph of the *Alcidæ*, places *Cepphus lomvia* of Pallas, with a query as a synonym under *Lomvia californica*, and remarks that "it is possible that this species rather than *troile* is alluded to by Pallas under the name of *Cepphus lomvia*" (Pr. Philada. Acad. 1868, pp. 79 and 80). Of the thick-billed Guillemot, from the Pribilof Islands, he says: "This bird is, of course, the true *arra* of Pallas" (Elliott's Aff. Alaska, p. 211).

But Pallas's birds are not so easily disposed of, as an inspection of his descriptions will show. It will be borne in mind that the chief distinction between the two Pacific forms is to be found in the bill, the one having a thick, robust beak, with dilated and naked tomia at the base of the upper mandible, while in the other the bill is slender, weak, and feathered along the base of the maxillar edge, the latter form being Bryant's *californica*.

Pallas gives a comparison of the bills of the two forms, described by him as *lomvia* and *arra* (Z. R. A., II, p. 347) in which he says: "Contra in *Lomvia* Camtschatica angulus rostri frontalis obsolete canaliculatus et carina sulco excavata [*scr.* excarata] *laterales* vero *rostri margines longe citra nares, ad fraenum oris usque nudi; quod non in Arra.* Anguli plumosi ultra nares procurrentes, carina curvilinea, nec angulata." This description does not leave the slightest trace of doubt that his *C. lomvia*, at least as far as his Pacific specimens are concerned, is the thick-billed form with the naked tomia, and, consequently, that it is *not* a synonym of *californica*. This will be the more plain if we look at his description of the bill of his *arra* on the same page: "Magnitudo et habitus omnin-

C. Lomviæ, sed rostrum minus et divertissimum, brevius, *compressius*, *minus robustum*, superius magis curvilineum, ... *basi minus denudatum.*"

It may now be asked, what is, then, *C. arra?* Is it the slender-billed form, equal to *californica*, and will it have to take the precedence over the latter name? Pallas says expressly that the tomia at base are *not* dilated and denuded: "quod non in *Arra.*"

I was myself very much puzzled by this question, and would probably have answered it in the affirmative had it not been for a specimen which I collected on Bering Island. It (No. 92934) is a bird of the year—not much more than six months old—and undoubtedly belonging to the thick-billed form, as is evident at the first glance, and still more so upon a close comparison with the *californica* of the same age. From this bird it is clear that the thick-billed species in the first year has the basal part of the tomia *feathered and not dilated*, the bill being at the same time much *shorter and more compressed* than in the old birds. Compared with *californica* of the same age it differs especially in the greater robustness and height of the bill, and especially by the much shorter gonys, the relative length of which is particularly diagnostic of the two species. What confirms my opinion that Pallas's *arra* is his *lomvia* in the first winter, is his expression "*superius magis curvilineum*," which will not fit *californica* in any stage of growth. I therefore think that we are justified in retaining the name "*arra*" for the thick billed Pacific form.

Dr. E. Coues was the first author to point out the differences between the Atlantic and the Pacific forms of the Thick-billed Guillemot (Elliott's Aff. Alaska, p. 211 (1875)), but he did not recognize it as worthy of a special name until in the second edition of his "Key," where the Atlantic bird is called *Lomvia arra svarbag*, and the Pacific simply *L. arra*, but under the system of nomenclature followed in the "Key" the Atlantic should have been called *Lomvia svarbag* and the Pacific *Lomvia svarbag arra*, as Pallas's name is later than that given by Brünnich.

For my own part the inspection of ample material has convinced me that the two forms are separable, and even better so than *troile* and *troile californica.*

The "*Are*"* is extremely abundant at the Commander Islands, and is

* The Russian name, derived from the voice of the bird, an angry ar-r-r, is originally applied to *U. troile* in Europe, and is consequently not specific for the Pacific which Pallas called *C. arra.*

perhaps at present the most numerous species of the region, although it is difficult to say whether *Lunda cirrhata* is not just as rich in individuals. Next come *Fulmarus glupischa* and *Phalacrocorax pelagicus*. It is by far more numerous, however, on Copper Island than on Bering Island, there being hardly an Are rookery on the whole northern part of the latter island, except on the outlying Arij-Kamen and at the northeastern corner.

They pass the winter away from the shores of the islands, probably on the open sea not far from them, as is indicated by living individuals occasionally appearing during the winter and dead bodies regularly cast ashore after each severe storm of that season.

About the 1st of April, or a little earlier, their enormous flocks approach the shore and take possession of the rookeries.

When breeding, the long rows of Ares on the narrow shelves of rock, where they have deposited their many-colored, large, pear-shaped egg, face the rocky wall with their white breasts, turning their black backs to the spectator. When flying off the nest they consequently are compelled to first turn round, and, if taken by surprise, this maneuver will often cause them to throw the egg from the shelf into the water. It happened several times when I stealthily approached in a boat under the breeding colonies, that several eggs were thrown into the boat when the birds rushed off the nests, if the bare rock upon which the egg is placed can be called a nest, and my Aleutian oarsmen were always in a roar of laughter when one of these projectiles exploded on the head of an unfortunate comrade.

A series of eggs of all shades, from white to deep greenish blue, were collected, and measure as follows:

U. S. Nat. Mus. No.	Stejn. No.	Lg. diam.	Sh. diam.
		mm.	*mm.*
21811	1217	79	50
	1218	81.5	50
	1219	84	51
	1220	78.5	48
	1221	81.5	53
	1222	81	52
	1223	83	51
	1224	79	48

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Culmen.	Gonys.	Height of bill at nostrils.	Tarsus.	Middle toe with claw.
			1883.		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
92934	1834	Bering Island	Jan. 3	♀ jun.	422	7	201	45	38	17	13	37	56
92935	2548	....do.....	Sept. 2	juv.	.....	.....	85	.....	19	9	7	32	41
92936	2547	....do.....	Sept. 2	juv.	.....	.....	83	.....	19	10	7	30	39

No. 92934.—Bill dark, almost blackish, bluish gray, with a light spot on gonys in front of the angle. Feet light bluish pearl-gray, with a faint yellowish tinge in front (not greenish, however); joints darker bluish gray, underneath blackish gray.

6. Uria troile californica (Bryant).

1822.—*Uria troile* Choris, Voy. Pittor., Aléout., pl. xx.—*Uria t.* Blakist. & Pryer, Ibis, 1878, p. 211.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 180.—*Id.*, *Ibid.*, X, 1882, p. 91.—Blakist., Amend. List B. Jap., p. 32 (1884).—*Lomvia t.* Bean, Pr. U. S. Nat. Mus., 1882, p. 172.

1859.—*Uria brünnichii* Heermann, Pacific R. R. Rep., X, Route to Calif. B. (p. 75), (*nec* Sab.).

1861.—*Catarractes californicus* Bryant, Pr. Bost. Soc. N. Hist., 1861, p. 142.—*Uria c.* Dall & Bannist., Tr. Chicag. Acad., I, 1869, p. 309.—Finsch, Abh. Brem. Ver., III, 1872, p. 77.—Dall, Avif. Aleut. Isl. Unal. eastw., p. 10 (1873).—*Id.*, Avif. Aleut. Isl. west. Unal., p. 10 (1874).—Stejneger, Naturen, 1884, p. 54.

1872.—*Lomvia troile* var. *californica* Coues, Key N. Amer. B., p. 346.—*Id.*, in Elliott's Aff. Alaska, p. 210 (1875).—Elliott, Monogr. Seal Isl., p. 135 (1882).—Nelson, Cruise Corwin, p. 117 (1883).

The California Guillemot occurs only in very limited numbers on the rookeries among the enormous masses of *U. arra*, the thick-billed species. Nothing particularly can be said about the present bird, as it is practically undistinguishable from the *arra* when on the rookery. Apparently they arrive, breed, and depart in company with the common *arra*, and are also found at sea around the islands like the latter during winter-time, as the specimen in my collection proves.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Culmen.	Gonys.	Height of bill at nostrils.	Tarsus.	Middle toe with claw.
			1882.		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
89092	1022	Bering Island ..	May 9	♀ ad.	380	.....	192	45	37	23	11	37	54
92944	1828	.....do.....	Dec. 29	.....	431	5	192	45	38	23	11	40	54

No. 89092.—Iris dark brown. Feet light yellowish gray, webs darker. Bill black; angle of mouth yellowish.

No. 92944.—Iris dark brown. Bill blackish brown, somewhat lighter on the middle of gonys. Feet light yellowish to brownish gray, joints and webs a little darker, tarsus and toes below blackish. Sexual organs indistinguishable.

Birds of the year of the two forms, *californica* and *arra*, may be distinguished thus: *Californica* has the culmen less curved, the gonys long, much longer than half the culmen, and the bill lower; the greater under wing-coverts are gray with white edgings; the shafts of the first primaries above are very light, nearly white; the color of the upper head and neck is more tinged with brownish. *Arra* has the culmen more curved, the gonys short, about half the length of the culmen, and the bill higher; the greater under wing-coverts darker and uniform gray without white edgings; the shafts of the primaries dark brownish; the color of the upper head and neck more glossy and black.

7. Cepphus columba PALLAS

1790.—*Uria grylle* β LATHAM, Ind. Orn., II, p. 797.

1826.—*Cepphus columba* PALL., Zoogr. Ross. As., II, p. 348 (*part.*).—TURNER, Auk, 1885, p. 159.—*Uria c.* CASSIN, U. S. Explor. Exped. Ornith., p. 346 (1858).—*Id.*, in Baird's B. N. Amer., p. 912 (1858).—*Id.*, Pr. Acad. Philada., 1862, p. 323.—SWINH., P. Z. S., 1863, p. 330.—DALL & BANNIST., Tr Chicag. Acad., I, 1869, p. 309.—FINSCH, Abh. Brem. Ver., III, 1872, p. 78.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 11 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 10 (1874).—TACZAN., Orn. Faun. Vost. Sibir., p. 73 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.—*Id.*, *ibid.*, 1883, p. 398.—BLAKIST. & PRYER, Tr. As. Soc. Japan X, 1882, p. 91.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 172.—NELSON, Cruise Corwin, p. 117 (1883).—HARTLAUB, J. f. Orn., 1883, p. 285.

1832.—*Uria grylle* KITTLITZ, Isis, 1832, p. 1105 (*nec* LIN.).—*Id.*, Denkw. Reise, I, pp. 273, 291.—*Cepphus g.* WHITELY, Ibis, 1867, p. 210.

This is the "*Kajurka*" of the natives, who do not recognize them by the Russian name "*Svistun.*"

The Pigeon Guillemot is a very common bird all around the shores of both islands, although not by far so numerous as several other *Alcidæ*, for instance, *Uria arra* and *Lunda cirrhata*. They are mostly found in single pairs. It has been denied that they ever congregate in large flocks, but this is not absolutely correct, for on several occasions I observed flocks of them, especially on June 4, 1883, when I visited the small island Toporkof, opposite the village of Bering Island. The whole islet was covered with hundreds and hundreds of birds in their full black summer plumage, collected into larger and smaller flocks, generally consisting of about fifty or more.

In 1883 the first arrivals were noted on the 14th of March. On Copper Island a nest containing two eggs (the usual number) was taken June 16, measuring 58 by 41^{mm}, and 58 by 40^{mm} (U. S. Nat. Mus. No. 21777; L. Stejneger No. 2211).

Downy young just out of the shell were collected at the same place on July 20, 1883. They are covered with a black down, and are in every respect similar to those of *Cepphus grylle.*

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
89098	1037	Bering Island	May 11, 1882	♂ ad.	347	.....	168	55	30	35	50
92940	2017	....do	May 8, 1883	♂ ad.	335	13	169	51	29	35	46
92941	2016	....do	May 8, 1883	♀ ad.	342	16	173	53	31	35	49
92942	2018	....do	May 8, 1883	♀ ad.	355	8	177	55	32	35	46
92943	1469	....do	Aug. 15, 1882	♀ jun.	316	.....	163	45	30	34	46
92937	2774	....do	Sept. —, 1883	juv.	.....	.....	143	47	23	34	43
92938	2270	Copper Island	July 20, 1883	pull.	164	.....	.....	.....	14	20	26
92939	2269	....do	July 20, 1883	pull.	129	.....	.....	.....	11	16	20

No. 92940.—Iris dark brown. Bill black. Feet deep vermillion; nails black. Fat. Stomach and crop empty. Only a few feathers in their sheaths.

No. 92941.—Colors as foregoing. Feathers all over the body still partly in their sheaths.

No. 92939.—Iris dark brown. Bill reddish black, with a white knob at the tip; angle of mouth brownish red flesh-color; interior of mouth pale salmon color. Feet reddish gray; webs lighter; tarsus behind blackish.

I have seen it stated somewhere—without now being able to lay hand on the reference—that the Black Guillemots pass from the white winter-plumage to the black breeding garb without moult. The idea, however, is quite erroneous, as amply proven by the remarks above.

8. Cepphus carbo PALLAS.

1826.—*Cepphus carbo* PALL., Zoogr. Ross. As. II, p. 350.—STEJNEGER, Pr. U. S. Nat. Mus. VII, Aug. 5, 1884, p. 225.—*Uria c.* MIDDEND., Sibir. Reis. II, 2 (p. 239, pl. xxiii, fig. 6), (1858).—CASSIN, Pr. Philada. Acad. 1862, p. 323.—SCHRENCK, Reis. Amurl. I, p. 496, pl. xvi, fig. 1 (1863).—BRANDT, Mel. Biol. VII, 1869, p. 206.—SWINH., Ibis, 1875, p. 458.—TACZAN., J. f. Orn., 1876, p. 203.—*Id.*, Orn. Faun. Vost. Sibir., p. 73 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.—BLAKIST. & PRYER, Ibis, 1878, p. 211.—*Iid.*, Tr. As. Soc. Jap. VIII, 1880, p. 180.—*Iid.*, *ibid.*, X, 1882, p. 90.—BLAKIST., Amend. List B. Jap., p. 32 (1884).—*Aloa c.* SCHLEGEL, Mus. P. B. Urinat., p. 17 (1867).

The Pacific Sooty Guillemot seems to be restricted to a very limited area, not being regularly found beyond the coasts of the Okotsk Sea, and the Sea of Japan. Pallas's statement that it is frequent about the Aleutian Islands, especially Unalashka is incorrect beyond doubt (cf. my memoir, Pr. U. S. Nat. Mus. VII, 1884, pp. 224–227), although stragglers of a marine species like the present may be expected in the adjacent waters.

I introduce this species as an accidental visitor to the Commander

Islands only on the strength of two pairs, which were observed by me at rather close quarters, but not shot.

In the evening of the 28th of April, 1883, I saw four black "Kajurkas" sitting on stones a little off shore to the south of the so-called "Reef Mys," near the village of Bering Island. I had good opportunity of watching them with an excellent field glass, but as the tide was running out and no boats or bajdarkas in the neighborhood, it was useless to try to shoot. They were uniform blackish without any white whatever on the wings, and the light patch on the eye-region was plainly visible, so that there cannot be the slightest doubt as to the correctness of the identification. I had been on a sharp lookout for this species during the whole spring season, and offered the native hunters a good reward for a wholly black "Kajurka," without white on the wings, but without results. That, during the following weeks I regularly revisited the place where at first I observed them, may be taken as almost a matter of course, but I never saw them again.

9. Synthliboramphus antiquus (Gmel.)

1788.—*Alca antiqua* Gmel., Syst. Nat. I, p. 554.—Schlegel, Mus. P. B. Urinat, p. 21. (1867).—*Uria a.* Kittlitz, Isis, 1832, p. 1104.—Temm. & Schleg., Faun. Jap. Av. (p. 124, pl. 80) (1849).—Sch encк, Reis. Amurl. I, p. 499 (1860).—Swinh., P. Z. S., 1863, p. 330.—*Id.*, Ibis, 1874, p. 166.—Whitely, Ibis, 1867, p. 209.—*Brachyrhamphus a.* Dall & Bannist., Tr. Chicag. Acad., I, 1869, p. 310.—Dall, Avif. Aleut. Isl., west Unal., p. 11 (1874).—Blakist. & Pryer, Ibis, 1878, p. 210.—*Id.*, Tr. As. Soc. Jap. VIII, 1880, p. 180.—*Id.*, *ibid.*, X, 1882, p. 90.—Blakist., Amend. List B. Jap., p. 8, (1884).—*Synthliborhamphus a.* Finsch, Abh. Brem. Ver., III, 1872, p. 80.—Dall, Avif. Aleut. Isl. Unal. eastw., p. 11 (1873).—Taczan., J. f. Orn., 1876, p. 203.—*Id.*, Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.—*Id.*, *ibid.*, 1883, p. 345.—Bean, Pr. U. S. Nat. Mus., 1882, p. 171.—Nelson, Cruise Corwin, p. 116 (1883).—Turner, Auk, 1885, p. 159.

1826.—*Uria senicula* Pallas, Zoogr. Ross. As., II, p. 367.

1837.—*Brachyramphus brachypterus* Brandt, Bull. Scientif., II, 1837, p. 346.

1839.—*Merygulus cirrhocephalus* Vigors, Zool. Blossom, Orn., p. 32.

1858.—*Uria cana* Kittlitz, Denkw. Reise, I, p. 288.

The *Starik* (=old man, so called probably from the white hair-like feathers on the head; hence Gmelin's name *antiquus* and Pallas's *senicula*) breeds on both islands, but only sparingly at Bering Island. In fact, the only place where I know it to nest with certainty on the latter is in the cliffs of the outlying islet Arij Kamen. On Copper Island it is more numerous, without being common there either.

They seem to pass the winter on the open ocean, not far from the islands, however, as two were seen and one was shot at Bering Island

January 3, 1883 (No. 92985). In 1883 they approached land during the first week of May.

During the voyage from San Francisco to the Commander Islands in the beginning of May, 1882, these birds were frequently observed on the ocean on both sides of the Aleutian chain, but out of sight of land. They would swim close to the steamer's side, so near as even to touch it and to be turned around when striking the vessel; when it had passed them about a little more than half its length they would suddenly dive, coming up again away behind us; then they would take to the wing and drop just a little to the right or the left of our bow, repeating this maneuver over and over again.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92985	1843	Bering Island	Jan. 3, 1883	♂ ad.	260	0	135	34	14	28	33
92987	2201	Copper Island	June 16, 1883	(♂) ad.	.....	.....	133	33	13	30	.....
92986	2224	....do	July 3, 1883	♂ ad.	273	21	129	32	13	28	34
92988	2225	....do	July 3, 1883	♀ ad.	260	22	130	36	12.5	27	29
89142	1470	....do	July —, 1882	(♂) ad.	.....	.....	.....	.....	.....	.....	.....

No. 92985.—Iris blackish brown. Bill light grayish white with a faint bluish tinge, darker grayish at base; culmen and tip of gonys blackish; interior of mouth, faint bluish white. Feet light grayish white with a tinge of violet blue; outer aspect of tarsus more bluish; joints and webs dark bluish gray; tarsus and toes underneath blackish. Testes very small. Stomach contained Gammaridæ. (Colors noted within the first thirty minutes after the bird was killed; they changed materially—to a bluish crimson on the bill—not many hours after).

No. 92986.—Iris dark brown. Bill whitish with a light tinge of violet gray; culmen, except the extreme tip and base of both mandibles, blackish brown. Feet similarly colored; joints darker violet gray; webs and underside blackish.

When I got the specimen in winter plumage I had also at hand fresh specimens of *Simorhynchus pygmæus* and *pusillus*. The similarity in the bill struck me, and I thought it desirable to institute a comparison while the birds were still in the flesh. The following remarks are an abstract of the original notes:

With the exception of the brownish, almost blackish, iris, and the scutellation in front of the tarsus, the *Synthliboramphus* seems to be nearer related to the *Phalerideæ* than to the *Uriinæ*. The nostrils are essentially as in the former group, particularly *S. pygmæus* and *pusillus*, anteriorly forming an acute angle while rounded behind; but being a little shorter they present a somewhat triangular or rather pear-shaped

form; they are situated a little higher, and the feathering of the face is extending a trifle farther towards the hind margin of the nostrils *without reaching them*, however; on the culmen the feathering goes further forward, surpassing the posterior border of the nostrils, but so it does in *S. pygmæus* also; the feathering of the mental angle advances far in front of that on the upper mandible; the nostrils are roofed over by a prominent nasal shield with a distinctly raised edge, quite similar to that of *S. pygmæus*, and, like those of the latter, *they are pervious;* a further similarity is the *soft and naked cere* at the base of culmen, which is rather *larger than* in *S. pygmæus*. The perfect similarity in the structure of these parts makes it extremely probable that they are periodically shed as in the *Phalerideæ*. In a fresh specimen of *Uria californica* I find the nostrils situated near the tomia, linear and not roofed by a prominent scale with raised lower margin; *no soft cere is visible*, and the loral feathering fills the nasal groove considerably beyond the anterior angle of the nostrils, while on the culmen it recedes as far as the posterior margin of the nostrils, the culmen thus forming an acute angle into the feathering of the forehead; the feathering of the mental angle does not go beyond that of the nasal grooves.

10. Simorhynchus pygmæus (GMEL.)

1788.—*Alca pygmæa* GMEL., Syst. Nat., I, p. 555.—*Phaleris p.* STEPH. Gen. Zool., XIII, pt. i, p. 48 (1825).—*Simorhynchus p.* BRANDT, Mélanges Biol., VII, 1869, p. 228.—NELSON, Cruise Corwin, p. 116 (1883).—STEJNEGER, Naturen, 1884, pp. 35, 55.—TURNER, Auk, 1885, p. 159.

1801.—*Alca kamtschatica* LEPECHIN, Nov. Act. Petropol., XII, 1801 (p. 369, tab. 8).—*Simorhynchus c.* SCHLEGEL, Mus. P. B. Urinat., p. 25 (1867).—BRANDT, Mélanges Biol., VII, 1869, p. 227.—FINSCH, Abh. Brem. Ver., III, 1872, p. 81.—TACZAN., Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 52.—DYBOWSKI, Sitzb. Dorpat. Naturf. Ges., 1881, p. —.—*Id.*, Orn. Centralbl., 1882, p. 41.—*Id.*, Bull. Soc. Zool. France, 1883, p. 349.—*Phaleris c.* BLAKIST., Amend. List B. Jap., p. 31 (1884).

1822.—*Mormon cristatellus* CUVIER, in Choris' Voy. Pittor., Aléout., p. 18, pl. xii (*nec* PALLAS).—*Phaleris c.* TEMM., Pl. Color., V, pl. 200 (1824).

1823.—*Mormon supercilliosa* LICHTENST., Doublettenverz., p. 89.

1826.—*Uria mystacea* PALL., Zoogr. Ross. As., II, p. 372.—*Phaleris m.* CASSIN, Perry's Exped. Jap., II, p. 234 (1857).—SWINH., P. Z. S., 1863, p. 331.—BLAKIST. & PRYER, Ibis, 1878, p. 210 (*part*).—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 179.—*Iid.*, *ibid.* X, 1882, p. 89.—SEEB., Ibis, 1879, p. 21.

1826.—*Uria crinita* PALL., Zoogr. Ross. As., I, p. 301, (*nom. nudum*).

1826.—*Phaleris cristella* BOIE, Isis, 1826, p. 980 (*err. typ.*).

1868.—*Simorhynchus cassini* COUES, Pr. Phil. Acad., 1868, p. 45.—BRANDT, Mél. Biol., VII, 1869, p. 235.—DALL & BANNIST., Tr. Chic. Acad., I, 1869, p. 309.—BAIRD, Tr. Chic. Acad., I, 1869 (p. 324), pl. xxxi, fig. 2.

My studies of the moulting of the plumage are based upon twenty-three specimens collected by me, consisting of birds in all ages and

nearly at all seasons, probably the largest material of this rare bird at the command of any ornithologist, and were made on the fresh birds before and during skinning, so that the results may be regarded as conclusive upon several points. They may be summed up briefly as under.

When the young leaves the egg, in the latter part of June, it is covered by a dense down, dark fuliginous above, lighter and more grayish on the abdomen. Such a specimen, No. 92977, only a few days old, was obtained, together with its father, No. 92973, both taken on the nest, on June 28, 1883. Another downy young (No. 92976) was collected July 12; it is half-fledged, the new plumage, on the whole, like that of the adults, being only a little lighter underneath, nearly pure white on the abdomen, but, before long, this light, or rather pure, color darkens, as in the young of *Lunda cirrhata*, and a young (No. 92974) killed only six days later, but fully fledged and without any trace of down left, is undistinguishable from the old ones as far as the general coloration of the plumage is concerned; the loral tuft, with its malar and superciliary branches, and the postocular stripe are indicated by light grayish feathers. The young bird I shot at Dikij Mys, Bering Island, on August 22, 1882, is identical with the last one, both being perfect counterparts of the type of Dr. Coues's *Simorhynchus cassini*. If any doubt should still linger concerning the identity of the latter with *S. pygmæus*, an inspection of my series will remove it from the most skeptical mind.

In this plumage the young remain until about the end of December, for No. 92962, shot on the 3d of January, is nearly identical with the last-mentioned young bird, with the exception of the bill, which is more vividly colored, and the general aspect of the plumage, which seems fresher and of a more slate-colored hue, owing to the fact that the feathers are new, many being still in their sheaths. But on the same date I obtained five other specimens which show all the intermediate grades between this and the fully developed plumage with the long and rich crests, as exhibited by No. 92960, which was shot five days previous, and by No. 92961, collected on the 30th of December. The wing feathers are yet in pretty good condition, and are not moulted now. Alongside with the development of the new contour-feathers and the ornamental plumes goes the increasing intensity and purity of the colors of the bill, the nasal shield of which, however, is still dusky. During the following months the bill assumes still more vivid colors,

the tip becomes nearly pure white, the middle scarlet, and the nasal shield finally, when the birds, just before the breeding season, appear at the rookeries, turns into a fine carmine, as shown by No. 92972 (Pl. IV, Fig. 2), a female shot May 6, 1883. But while in this specimen the bill shows its highest perfection, the plumage already bears evidence to the commencing decay caused by the wear of the feathers while inhabiting the deep nest-holes in the crevices of the rocks, and the abrasion is particularly visible on the wing-coverts, which were not shed when the other feathers of the body were moulted, viz, late in winter, the middle row being light brownish gray, as are also the exposed parts of the inner primaries. Also the ornamental plumes are on the decline, and the frontal crest is already thinned out considerably, consisting in the specimen in question of only four plumes, while some birds in "full dress" may be found having as many as a dozen. During the incubation the plumage becomes gradually more dilapidated, and when the young are out, the parents—at other seasons so graceful and beautiful—present a rather miserable aspect, the white plumes on the head being soiled and glued together, and all the wing-feathers faded into a dirty gray, with the vanes disconnected and the edges ragged. All the birds taken on the nest, July 21, were in that deplorable condition, only that the wings were spotted with slaty black as the new coverts made their appearance now, the middle row being complete already. Also the four or five inner primaries were shed, and the new ones, in different stages of development—the three innermost full grown—contrasted favorably against the faded-out remnants of the old ones. The tail-feathers are still unshed, but their condition plainly shows that they will be moulted before long. The ornamental feathers are worn down, the crests are thin, and many of the long plumes have already disappeared. These specimens prove beyond a possibility of doubt that the remiges and rectrices are moulted towards the end of the breeding season, and that the process commences with the inner primaries*. But not only are the wing-feathers shed now, but also the contour-feathers; all over the body protrude now the bluish sheaths containing the new feathers, which in some places have already burst through the tips. The post-nuptial moult, therefore, is a complete one.

*That the process is similar in the allied *Ptychoramphus aleuticus* (PALL.) is evident from a specimen (U. S. Nat. Mus. No. 100070) collected by Mr. Charles H. Townsend at the Farallon Islands on September 11, 1884. It has just moulted all the primaries which are full grown, except the first one, which is still partly in the sheath.

At this time the brightness of the bill has likewise faded away, the white tip gets bluish, and the basal parts darken. The upper layers of the horny covering scale off, but I feel satisfied that a regular sheding of the basal parts, such as in the *Fraterculæ* does not take place. In order to sustain this opinion I quote from my original notes taken down when examining four fresh birds on Copper Island, July 21, 1883: "The nasal shield is blackish brown, but of a peculiar appearance, as if veiled by a thin translucent crust. This was easily removed with the knife, and when detatched presented a very thin and translucent piece of oval shape, but with lacerated edges. In the same manner the small space between the two ridges behind the nostrils was easily deprived of a similar crust. In two specimens the covering of the terminal part of the bill is scaling off in a similar manner, bursting irregularly near the border of the basal part, and along both sides of the culmen, and the same process seems to begin on the lower jaw also. *The layer underneath is not perceptibly softer.*" It should be remarked that the basal parts were hard, as they were in all the specimens collected in December and January, and also in the young birds. The reverse was the case in specimens of *Lunda cirrhata* and *Fratercula corniculata* of corresponding date and age.

It remains now to point out and correct some minor errors of my predecessors, particularly Messrs. Dr. Dybowski and L. Bureau. As to the latter's statement (B. S. Z. F., 1879, p. 63), "En hiver, ces lamelles [la cuirasse nasale] se détachent sans doute, et laissent a découvert une simple membrane nasale," it may suffice to refer to my remarks above. In reference to the descriptions given by the former (Orn. Centrbl., 1882, p. 41), it is at once apparent that the colors of the bill and feet are taken from the dried specimens, consequently being quite erroneous. The bill is not "dark violet towards the tip and the tip itself whitish violet" in the fresh or living bird, but turns so after the lapse of some time; nor are the feet "reddish or yellowish ashy gray," but light bluish gray!

His description of the different crests and ornamental feathers are not quite correct, as will be seen by comparing them with my figure (Pl. IV, Fig. 2), which was drawn and colored from the fresh bird, *before skinned*, and with Dr. Dybowski's descriptions lying before me. It is particularly the note, designated by him as D, 4, a, which is inaccurate. Furthermore, he asserts in a very general way, that the white ornamental feathers on the side of the head stand out like

crests in the living bird.* I do not know what facilities he had for observing the living birds, but I can affirm that on five living birds which I possessed for several days, neither the anteocular nor the subauricular plumes were ever raised, nor did I observe it in any of the many birds I had the good fortune to observe in the free state. That these ornaments may occasionally be raised is not improbable, but it is not the general manner in which they are carried.

But the most curious blunder of Dr. Dybowski in connection with this species is the assertion that all the plumes forming the curious curved black crest on the forehead originate from a single common shaft: "Alle 12 Federchen haben eine gemeinsame Federspule"! Any one familiar with the structure of birds' feathers will at once suspect this wonderful discovery, and consequently I investigated the case very thoroughly; in fact, I dissected the crest out of No. 2334 (U. S. Nat. Mus. No. 102224), which was obtained at Copper Island on July 21, 1883, and the preparation is now in the United States National Museum. This shows, as might be expected, quite a different state of affairs, each plume having, as a matter of course, its own separate shafts, springing from individual follicles, and being in no way connected with its neighbor, as the roots are inserted about 0.3^{mm} apart from each other. The specimen in question possesses seven plumes, which are arranged thus: First come three plumes alongside each other; just behind the intervals between them are two feathers, forming the second row; next come two feathers, a third one having dropped out, if I am not mistaken; in front of the first row are two empty follicles, the plumes of which must have dropped out only recently; ten plumes can thus be traced, and are situated in the following order: 2-3-2-3, thus:

They are consequently arranged in "quincunx," or, in other words, in the same manner as all the other feathers. The "plumes" are only extremely lengthened, but otherwise they are normal contour-feathers!

* "Alle diese drei Federzüge stehen beim lebenden Vogel schopfartig vom Körper ab." (*l. c.*).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92960	1823	Bering Island	Dec. 29, 1882	♂ ad.	185	11	105	33	10	22	30
92961	1829	....do	Dec. 30, 1882	♂ ad.	181	3	109	31	10	21	30
92962	1837	....do	Jan. 3, 1883	♂ ad.	195	.....	106	30	10	22	31
92966	1841	... do	Jan. 3, 1883	♂ ad.	190	.....	113	31	10	22	31
92967	1842	....do	Jan. 3, 1883	♂ ad.	195	.....	108	30	10	22	31
92964	1839	....do	Jan. 3, 1883	♂ ad.	195	.....	114	35	10	22	32
92968	1854	....do	Jan. 5, 1883	♂ ad.	192	.....	112	35	10	22	31
92969	1866	....do	Jan. 9, 1883	♂ ad.	191	.....	105	33	10	22	32
92970	1871	....do	Jan. 16, 1883	♂ ad.	193	0	108	33	10	21	32
92973	2203	Copper Island	June 28, 1883	♂ ad.	207	17	113	33	10	22	31
89140	1475	....do	July, 1882	(♂)ad.	.....	.....	110	30	.....	23	31
89139	1474	.. do	July, 1882	(♂)ad.	.....	.....	107	27	9	22	30
89141	1476	....do ..	July, 1882	(♂)ad.	.....	.....	.....	.....	.....	.....	.....
92959	1808	Bering Island	Dec. 14, 1882	♀ ad.	188	0	104	29	9	22	30
92963	1838	....do	Jan. 3, 1883	♀ ad.	184	.....	105	30	10	22	32
92965	1840	....do	Jan. 3, 1883	♀ ad.	192	.....	106	30	10	22	.....
92971	1894	....do	Jan. 30, 1883	♀ ad.	203	.....	110	31	10	22	31
92972	2014	....do	May 6, 1883	♀ ad.	211	.....	110	31	10	23	33
92975	2285	Copper Island	July 21, 1883	♀ ad.	.....	.....	105	27	10	22	.....
102224*	2334	...do	July 21, 1883	ad.	.....	.....	.....	.....	.....	.....	.....
92974	2266	....do	July 18, 1883	♂ juv.	195	9	105	30	10	23	33
89099	1486	Bering Island	Aug. 22, 1882	juv.	180	.....	107	31	10	21	32
92976	2235	Copper Island	July 12, 1883	♀ pull.	171	.....	68	.....	9	21	27
92977	2202	....do	June 28, 1883	♂ pull.	128	.....	.....	.....	7	17	22

* Preserved in alcohol.

No. 92960.—Iris white. Bill, milky white at tip and at base of lower mandible; rest of the bill, including culmen, upper tomia, and a median cross-band on lower mandible, vivid blood-red; nasal cuirass and a small portion in front of nostrils, as well as the soft cere at base, blackish brown. Feet light bluish gray, with the joints somewhat brownish violet, the tinge of the blue being different from that of *S. pusillus* (L. S., No. 1818), mixed as it is with "neutral tint;" soles and webs blackish. Contents of crop and stomach Gammarids. Colored drawing (pl. iv, fig. 1) prepared immediately.

No. 92961.—Iris white. Testes somewhat swollen; crop and stomach contained Gammarids.

No. 92962.—Iris white. Bill, blackish brown on nasal cuirass, and a little in front of nostrils, then dull red, and at tip horny, brownish white. Feet, light bluish gray, with a faint violet tinge. Testes, small, not swollen. Lean; crop contained Amphipods.

No. 92966.—Iris white. Testes, small, not swollen. Fat. Crop contained small Amphipods.

No. 92964.—As foregoing, but feet a trifle more bluish. Not fat. Amphipods.

No. 92968.—Iris white. Bill somewhat pale, the red portion being hardly deeper colored than reddish flesh-color. Feet a little more bluish than usual. Testes small, not swollen.

No. 92959.—Iris white, with a faint, yellowish tinge. Bill dull blood red, with the base of culmen, the nasal cuirass, and a small portion in front of the nostrils blackish brown; base of upper tomia pale brownish gray; tip of upper mandible dark brownish gray; lower mandible somewhat paler, almost flesh-colored at base, and behind the brownish tip. Feet, light bluish gray, with a faint brownish tinge on the joints; soles, nails, and webs, blackish; interior of mouth white, with a light flesh-colored tinge; stomach empty, with the exception of the shell of a small Gastropod and three horny hooks of a Decapod.

No. 92971.—Stomach and crop filled with Gammarids.

No. 92972.—Iris white. Bill vivid scarlet, the nasal cuirass tinged with carmine, the rest slightly mixed with orange; edges and angles of nasal cuirass with blackish marks; tip of both mandibles

and a narrow space round the base of the lower one milky white, with a faint shade of blue, strongly contrasting with the red; feet bluish gray, tinged with violet; joints, darker gray; webs and soles blackish. Eggs in ovarium swollen, the largest one 4½ mm in diameter. Stomach and crop, empty. Lean. New feathers protruding, especially on belly, neck, and head.

No. 92974.—Iris, inner ring, bluish gray, narrow; outer one, faint bluish white; when alive the pupil was contracted and very small. Bill, blackish brown, underneath the nostrils lighter grayish, as is also the lower mandible; feet, light bluish gray; joints, brownish; webs, dark gray; soles, blackish; colors from the *living* bird. Testes, very small and undeveloped. Bones, well ossified. Most feathers yet in their sheaths. Not fat.

No. 89099.—Iris white, with a faint yellowish tinge. Bill, reddish black, lighter at base. Feet, violet, bluish in front, reddish on sides, black behind and below, as are also the webs. Interior of mouth whitish.

No. 92976.—Iris, inner ring, narrow, bluish gray; outer one, light bluish white. Bill dark brownish gray: upper mandible almost blackish; a faint violet tinge below the nostrils, and on the lower mandible towards the base. Feet, gray, strongly tinged with violet; joints darker brownish; webs dark gray, below, blackish. Extremely fat.

No. 92977.—Iris clear gray with a faint bluish tinge. Bill blackish gray; culmen and middle portion of lower mandible lighter, somewhat violet-gray; nasal cuirass and angle of mouth, blackish, as is also the naked eye ring. Feet light gray, with a violet bluish tinge; joints darker gray; claws light, horny gray, with blackish tips; tarsus and toes underneath, blackish gray. Testes, recognizable. Crop filled with Gammarids; very fat.

This little Auk, certainly the prettiest species of the whole family, has apparently the center of its distribution on the islands visited by me. On Bering Island it is rather rare, however, though it breeds in the crevices of the outlying islet Arij Kamen, in a precipice near the fishing-place Saranna, and probably in several places on the southern part of the island, for instance, at Dikij Mys. Copper Island, with its steep rocky shores, is the favorite home of this bird, however. It may be found breeding all around the coast where suitable holes and crevices occur. I know of nesting places near the main village, at Karabelnij, and on Tschornij Mys. At the latter place it occupied holes in the basaltic cliff along side those of *Oceanodroma furcata*, the latter inhabiting the deeper ones. It could be told at once by the peculiar smell emanating from the caverns of the latter bird, which species was to be found inside.

Notwithstanding the fact that the birds are rather common, it must be considered good luck to meet them and get opportunity of observing them, for they are rather shy and live quite retired in their deep holes.

They are early breeders, in that respect being considerably ahead of their allies, for instance, *Lunda cirrhata;* so early, in fact, that no eggs could be procured in the latter part of June, when I had the opportunity to go in search of them. The nests at that time already contained young ones. These remain in the nest until full fledged. A specimen having left the nest only a few days previous, was taken alive on board the steamer when at anchor at Glinka, Copper Island, July 18. This bird was found early in the morning, concealed in a fold of one of the sails, the inexperienced youth having probably mistaken it for the

crevice of a rock. This would indicate that they pass the nights in holes as long as they stay near land.

When the breeding season is over, they, like all the allied forms, retire to the open ocean, part of them at least, going to more southerly latitudes to winter. That many stay in the neighborhood of the islands is evident from the fact that I obtained numerous specimens at Bering Island in December and January. A single female came near the coast on December 14, 1882, and was shot; but from the 29th of the same month until January 5, 1883, a few could be met with every day. They could then be seen in small societies of two to four, swimming along the rocky shores, alternately diving for food, which chiefly consisted of Gammarids. When diving they raised themselves a little on the water, and then made a sudden jump downward. The weather was not stormy, but we had during that week a very cold spell. Later in January they became scarce, but a few specimens were secured, the last one on January 30. They appeared again at their breeding places during the first days of May.

Owing to the comparative scarcity of this species at Bering Island, the natives there are not so familiar with it as are the Copper Islanders, and have therefore no peculiar name for it, calling it sometimes the "Malinka Konjuga" (small *S. cristatellus*), or using the more general and indefinite term "Petuschka." The inhabitants of Copper Island have no Russian name for it either, but it is well known to them under the Aleutian name "Turuturk" (pronounce: Too-roo-toork).

11. Simorhynchus cristatellus (PALL.)

1769.—*Alca cristatella* PALLAS, Spicil. Zool., V, p. 18, pl. iii, et pl. v, figs. 7, 8, 9.—*Uria c.* PALL., Zoogr. Ross. As. II, p. 370 (1826).—*Phaleris c.* SCHRENCK, Reis. Amurl. I., p. 500, tab. xvi, figs. 4 and 5 (1860).—COINDE, Rev. Mag. Zool., 1860, p. 402.—SWINH., P. Z. S., 1863, p. 330.—WHITELY, Ibis, 1867, p. 209.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 309.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 11 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 11 (1874).—SEEB., Ibis 1879, p. 21.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 179.—*Iid.*, *ibid.* X, 1882, p. 89.—PALMÉN, Swed. Cat. Lond. Fish. Exh., p. 201 (1883).—BLAKIST., Amend. List B. Jap., p. 31 (1884).—*Simorhynchus c.* SCHLEG., Mus. P. B. Urin., p. 25 (1867).—BRANDT, Mel. Biol., VII, 1869, p. 223.—FINSCH, Abh. Brem. Ver., III, 1872., p. 81.—COUES, in Elliott's Aff. Alaska, p. 206 (1875).—TACZAN., Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.—*Id.*, *ibid.*, 1882, p. 398.—DYBOWSKI, Sitzb. Dorpat. Naturf. Ges., 1881, p. —. —*Id.* Orn. Centralbl., 1882, p. 28.—*Id.*, Bull. Soc. Zool. France, 1883, p. 349.—ELLIOTT, Monogr. Seal Isl., p. 134 (1882).—SEEB., Ibis, 1882, p. 368.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 171.—NELSON, Cruise Corwin, p. 116 (1883).—TURNER, Auk, 1885, p. 159.—*Tylorhamphus c.* TACZAN., J. f. Orn., 1876, p. 203.

1769.—*Alca tetracula* PALL. Spicil. Zool. V, p. 23, pl. iv, et. pl. v, figs. 10, 11, 12.—KITTL., Denkw., II, p. 214 (1858).—*Uria t.* PALL., Zoogr. Ross. As., II, p. 371.—*Phaleris t.* MIDDEND., Sibir. Reis., II, 2 (p. 239) (1853).—SWINH., P. Z. S., 1863, p. 331.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 309.—TACZAN., Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 52.

1776.—*Alca cristata* MÜLL., Syst. Nat. Suppl., p. 104.

1826.—*Uria dubia* PALL., Zoogr. Ross. As., II, p. 371.—*Alca d.* KITTL. Denkw., I, p. 300 (1858).

1839.—*Phaleris superciliata* AUDUB., Orn. Biogr., IV (pl. 402).

1878.—*Phaleris mystacea* BLAKIST. & PRYER, Ibis, 1878, p. 210 (*part*).—SEEB., Ibis, 1879, p. 21.

The changes of plumage of this species are identical with those of *Simorhynchus pygmæus*, and as the latter have been described with considerable detail, I shall content myself by referring to my remarks under the heading of that species.

I may, however, call attention to a feature of the nuptial plumage of the present species, which has not been noticed by previous authors, so far as I am aware. I refer to the numerous and exceedingly fine hair-like white plumes which are interspersed with the others on the crown and nape. They are particularly noticeable and numerous on a ♀, shot May 16 (No. 89096). In a ♂, collected June 4 (No. 92955), they are greatly reduced, and in all probability they are only present during a very short period.

During the breeding season the bill of this species differs greatly from that of *S. pygmæus*, though in winter they are very much alike. The sides of the mandible, of the maxilla, and the nasal cuirass are swollen, and the different pieces separated by deep grooves, and at the base of the maxillar tomium is developed a more or less irregularly rounded horny and hard piece, which has a superficial resemblance to the "rosette" of the genera *Lunda* and *Fratercula*, without in any way being homologous with the latter structure. The "rosette" is more or less soft, being a kind of wattle lining the angle of the mouth all round, both above and beneath; the tomial plate of *S. cristatellus* is hard, horny, and is only affixed to the upper edge of the basal part of the tomium. It is only fixed to the edge of the commissure along its lower border, the upper half being entirely free and concealing the feathers behind it. These different basal pieces are evidently regularly shed, as in the *Fraterculæ*, and at the same time. Of all the rich material at my disposal, no specimen was taken during the more advanced stage of this shedding, so it is impossible to say just how many pieces fall off separately. So much is certain, however, that the above-mentioned circular corner-

piece is shed first, and comparatively early, several specimens affording evidence that it drops off before the birds leave the rookeries. The material at hand also indicates that the outgrowth in spring and the change of color of the basal parts of the bill takes place rather late and very rapidly, much more so than the corresponding process in *Lunda* and *Fratercula*.

As to the condition of the bill and the basal part of the upper tomium in winter, I refer to fig. 5, on plate iv, and to the following description of these parts which I took down from the fresh specimen (No. 92952) as follows: "The feathering at the base of the maxilla does not (as in *S. pygmæa* and *pusilla*) cover the tomium, which is soft and forms a whitish, broadened lobe above the corner of the mouth." No corresponding structure was observed in the other species. This soft lobe, the "matrix" of the horny circular corner-piece, is hardly noticeable in the dried skins.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
89097	1058	Bering Island	May 16, 1882	♂ad.	240	.....	134	39	11	27	37
92955	2122	... do	June 4, 1883	♂ad.	260	9	134	40	12	28	39
92954	2130	... do	June 4, 1883	♂ad.	273	11	134	38	13	29	....
89096	1057	....do	May 16, 1882	♀ad.	249	.....	138	37	11	29	40
92956	2093	....do	May 19, 1883	(♀)ad.	(235)	.....	133	40	12	29	38
92957	2172	....do	June 14, 1883	♀ad.	266	15	134	36	12	28	38
92952	1765	....do	Dec. 2, 1882	♀	247	.....	125	33	11	28	39
92951	1832	...do	Jan. 1, 1883	♀	265	23	126	35	11	27	39
92953	1875	....do	Jan. 18, 1883	♀	254	.....	133	35	11	26	37
92958	1932	....do	Mar. 1, 1883	♀ad.	270	.....	135	35	11	29	39

No. 89097.—Iris white. Bill reddish orange; tip horny white, shaded with dusky, on upper mandible. Feet light violet gray; joints darker; webs blackish; tarsus and toes below black; nails gray at base, blackish at tip.

No. 92955.—Iris white. Bill bright reddish orange; tip horny brownish white. Feet light violet gray; joints darker. Crop and stomach empty.

No. 92954.—Iris white. Color of bill and feet as foregoing number, only that the feet have a more pure bluish hue. Stomach empty. Very fat.

No. 89096.—Iris white. Bill reddish orange; tip brownish gray; tip of lower mandible somewhat lighter; interior of mouth white, with a slight tinge of flesh color. Feet light violet gray; joints darker; web, soles, and nails black.

No. 92952.—Iris white. Bill horny brown; both mandibles at base and the gonys lighter; soft edge at base of upper mandible whitish; interior of mouth white, faintly tinged with flesh color. Feet violet pearly gray; joints brown; webs and soles dark brownish. Stomach empty.

No. 92951.—Iris white. Bill horny brown; tip of upper mandible more grayish; lower mandible lighter, almost brownish flesh color. Feet bluish gray, a trifle darker and more violet than in *Stenorhynchus pygmæus*; joints brownish; webs and soles blackish. Extremely lean.

No. 92983.—Iris white. Bill brownish gray. Feet light bluish gray. Found dead on beach. Œsophagus, crop, stomach, and intestines filled with a semifluid violet red matter, which I take to be the remains of a cephalopod. Tolerably fat.

No. 92986.—Iris white. Bill, see colored drawing taken immediately from the fresh bird (tab. iv, fig. 5). Feet bluish gray; joints violet brown; webs and soles blackish. Some of the eggs in the ovary had commenced swelling. New feathers in their sheaths on upper head and neck.

The present species is a regular breeding bird of both islands, without being very plentiful, however, and seems to be rather scarce on Copper Island, where *S. pygmæus* is more common than the "Konjuga," a name by which *cristatellus* is known on Bering Island.

Like most of the members of the family, many winter on the ocean, not very distant from the islands, as it was among the species which I picked up on the beach after severe gales.

12. Simorhynchus pusillus (Pall.)

1826.—*Uria pusilla* Pallas, Zoogr. Ross. As., II, p. 373.—*Phaleris p.* Coinde, Rev. Mag. Zool., 1860, p. 403.—Cassin, Pr. Philada. Acad., 1862, p. 324.—Dall & Bannist., Tr. Chicag. Acad., I, 1869, p. 309.—Blakist. & Pryer, Tr. As. Soc. Jap., VIII, 1880, p. 179.—*Id., ibid.*, X, 1882, p. 89.—Blakist., Amend. List B. Jap., p. 31 (1884).—*Simorhynchus p.* Finsch, Abh. Brem. Ver. III, 1872, p. 81.—Coues, in Elliott's Aff. Alaska, p. 208 (1875).—Elliott, Monogr. Seal Isl., p. 134 (1882).—Turner, Auk, 1885, p. 159.—*Ciceronia p.* Taczan., J. f. Orn., 1876, p. 203.—*Id.*, Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 51.—Dybowski, Sitzb. Dorpat. Naturf. Ges., 1881, p. —.—*Id.*, Orn. Centralbl., 1882, p. 28.—*Id.*, Bull. Soc. Zool. France, 1883, p. 350.—Nelson, Cruise Corwin, p. 116 (1883).

1831.—*Phaleris corniculata* Eschscholtz, Zool. Atlas, IV (tab. 16).

1837.—*Phaleris pygmæa* Brandt, Bull. Scientif., II, 1837, p. 347 (*nec* Gmel., 1788).—*Simorhynchus p.* Schlegel, Mus. P. B. Urinat., p. 23 (1867).—Seeb., Ibis, 1884, p. 31.

1837.—*Phaleris microceros* Brandt, Bull. Scientif. II, 1837, p. 347.—Dall & Bannist., Tr. Chic. Acad., I, 1869, p. 309.—*Ciceronia m.* Palmén, Swed. Cat. Lond. Fish. Exh., p. 201 (1883).—Saunders, Ibis, 1883, p. 348.

1838.—*Phaleris nodirostra* Bonap., Comp. List, p. 66.

1839.—*Cerorhinca occidentalis?* Vigors, Zool. Voy. Blossom, Orn., p. 33 (*nec* Bonap.).

1878.—*Mergulus* sp. inc., Blakist. & Pryer, Ibis, 1878, p. 210.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92979	1818	Bering Island.....	Dec. 29, 1882	♂	170	.....	92	29	9	18	26
92981	1826	....do	Dec. 29, 1882	♂	184	.....	93	34	9	20	27
92980	1825	....do	Dec. 30, 1882	♂	175	3	94	32	9	20	28
92983	1835	....do	Jan. 3, 1883	♂	168	.....	96	28	9	19	28
92978	1763	... do	Dec. 1, 1882	♀	173	.....	92	31	9	20	27
92982	1827	....do	Dec. 29, 1882	♀	169	0	91	27	9	21	27
92984	1836	....do	Jan. 3, 1883	♀	172	.....	91	28	9	19	....

No. 92979.—Iris white. Bill horny brown; gonys and tomia somewhat lighter; extreme tip of lower mandible whitish. Feet light whitish cobalt blue; joints darker, a little purplish; soles and webs blackish. Crop contained several small Gammaridæ; in the stomach remains of a larger one.

No. 92981.—Iris white. Bill horny brown; tip whitish; gonys reddish flesh color. Feet light bluish gray; joints marked with brownish violet; soles and webs blackish. Testes large and swollen. Stomach and crop empty.

No. 92980.—Iris white, with a faint rosy tinge. Bill horny blackish brown: under mandible lighter; tip whitish. Feet light grayish blue, with a faint yellowish tinge, except on the joints, which are darker and marked with purplish blue; soles and webs blackish. Testes small, not swollen. Stomach and crop contained Gammaridæ and Palæmonidæ.

No. 92983.—Iris white. Bill horny black; extreme tip of lower mandible whitish. Feet light grayish blue; darker blue on the joints; webs and soles blackish. Testes small, not swollen. Several new feathers in their sheaths on the back. Crop crammed with small Palæmonidæ. Lean.

No. 92978.—Iris white, with a faint rosy tinge. Bill horny black; gonys and base of lower mandible light flesh color; interior of mouth whitish. Feet light grayish blue; joints somewhat brownish; webs and soles black. Stomach empty.

No. 92984.—Iris white. Crop contained Amphipods.

In addition to the above notes on the color of the naked parts, contents of stomach, &c., a series of remarks were taken down from the fresh birds in order to show the relative proportions of different parts and other points which might be of interest as showing features not observable in the dried skins. The original notes read as follows:

No. 92978.—Membrane covering the nasal groove soft, except the prominent ridge forming the hind and upper border of the nostrils. The cere covering the culmen between the nostrils entirely soft, and of the color of the bill. No knob.

No. 92979. When the legs are stretched backwards the distal end of the first phalanx of the middle toe reaches tip of tail; tip of folded wings reach a little beyond the digito-tarsal joint. Middle toe without claw decidedly longer than the outer one; end of inner toe reaches penultimate phalanx of the middle toe. Feathering on mental angle reaches as far as the fore border of the nostrils. No knob.

No. 92981.—Proportions similar to those of the foregoing number, only that the wings hardly reach beyond the tarsal joint. On the bill the cere is raised a little on the culmen, on which several longitudinal furrows are visible, indicating the beginning of the knob.

No. 92982.—Tips of closed wings and end of tail reach middle of basal phalanx of middle toe, legs being stretched backwards. Middle toe decidedly longer than outer one. Knob very small, but fairly perceptible.

No. 92980.—Tip of tail reaches first joint of middle toe; the latter without claw longer than the outer toe. At base of culmen a compressed knob, 1.5^{mm} long, 0.5^{mm} broad, and 1^{mm} high, highest behind. The upper surface of the knob is furrowed lengthwise, as if the knob were composed of four or five vertical leaves or layers. This is the original of the drawings.

Almost every one of the specimens had some injuries to their feet, phalanges wanting, webs split, &c. No. 92984 had even the whole left foot amputated, just beneath the heel, and the wound completely healed, and No. 92980 had the bone of the right tibia in the middle grown out to a big knot many times as thick as the bone in its normal condition.

All the specimens were lean, several of them even extremely so.

The plumage is still the so-called winter plumage; that is, the lower surface is still pure white, except in one skin (No. 92981), in which a few feathers on the abdomen are edged with dusky, as in summer specimens. But the white ornamental plumes of the face are present in all stages of development, from mere white specks until fully grown out, as in the head figured. The sequence of the following numbers indicates the

gradual increase of the number and size of these plumes: 92979, 92984, 92983, 92982, 92981, 92978, 92980.

Considering that most of the above specimens were obtained during the week between Christmas and New Year, the following conclusions seem to be justified:

The Least Auk, after the breeding season is over, probably at the same time as the corresponding process takes place in the allied species, loses the peculiar knob at the base of the culmen together with the lengthened and pointed white plumes ornamenting its face and head. About the end of the year, in some individuals earlier, in others later, a new knob and new ornamental feathers grow out, and, shortly after, the moult of the feathers of the body commences. The color of the bill also begins to change at the same time.

Dr. Dybowski asserts that he has found *Ciceronia pusilla* "nesting" at the Commander Islands ("nistend," Orn. Centrbl., 1882, p. 28). He gives no particulars, however, and during my subsequent sojourn on the island I could learn nothing about it. One thing is sure, that he got no eggs from there, and I doubt very much that the species has ever been found "nesting" on the islands. The birds are unknown to the inhabitants, at least to those of Bering Island, which I learned by showing them my winter specimen. Nor have they any vernacular name for the bird. In all probability Dr. Dybowski has been misinformed about the date of his specimen, which, curiously enough, is not mentioned by Taczanowski in his lists of the birds from Kamtschatka.

It was on December 1, 1882, that a specimen was brought me from Ladiginsk, on Bering Island. It was in full winter plumage, entirely white beneath, without knob, and with only a few traces of white feathers on the face. A few days before the end of the year several birds came near the shore, where they now could be seen to swim in small troops, or more frequently by twos and threes, parallel to the coast about a hundred yards off shore, according to the depth, usually in three-fathom water, where they dived with great expertness for Amphipods, which at that time seemed to be their chief or only food. When diving they lifted themselves up a little, and went down with a quick jump.

We were having a severe spell of cold when they made their appearance, and when it was over they disappeared again, none being seen after the 5th of January. They evidently winter on the open ocean somewhere about the islands.

13. Cyclorrhynchus psittaculus (PALL.)

1769.—*Alca psittacula* PALLAS, Spicil. Zool., V (p. 13, pl. ii et pl. v, figg. 4, 5, 6).—*Lunda ps.* PALL., Zoogr. Ross. As., II, p. 366.—*Ombria ps.* ESCHSCHOLTZ, Zool. Atlas, IV (p. 3, tab. 17) (1831).—MIDDEND., Sibir. Reise, II, 2 (p. 239) (1853).—SWINH., P. Z. S., 1863, p. 331.—BRANDT, Mel. Biol., VII, 1869, p. 237.—FINSCH, Abh. Brem. Ver., III, 1872, p. 82.—DYBOWSKI, Sitzb. Dorpat. Naturf. Ges., 1881, p. —.—*Id.*, Orn. Centralbl., 1882, p. 40.—*Simorhynchus ps.* SCHLEG., Mus. P. B. Urinat., p. 24 (1867).—*Phaleris ps.* COUES in Elliott's Aff. Alaska, p. 204.—ELLIOTT, Monogr. Seal Isl., p. 134 (1882).—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 89.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 171.—NELSON, Cruise Corwin, p. 115 (1883).—BLAKIST., Amend. List B. Jap., p. 31 (1884).—*Cyclorhynchus ps.* TURNER, Auk, 1885, p. 159.

1860.—*Phaleris aleuticus* COINDE, Rev. et Mag. Zool., 1860, p. 403 (*nec* PALL., cfr., also Bureau, Bull. Soc. Zool. France, 1879, p. 49).

In order to find out the types of the different generic and subgeneric names of the group *Phaleridinæ* we will have to resort to the "method of elimination." The matter then stands as follows:

1819. Merrem is said to have established the genus *Simorhynchus* (*nec* KEYS & BLAS., 1840, *qui Terekia* BP.) upon *A. cristatella* PALL. As early as 1868 Dr. Coues asked, "Where is this genus named?" but nobody seems to have been able to give an answer. Nor do I know whether Merrem included more species than *cristatella* in this apocryphal genus. Anybody having the opportunity of investigating the matter would gain the lasting thanks of ornithologists by publishing the results—preferably a full extract of Merrem's paper as far as it relates to the present question—in any of the standard ornithological periodicals.*

1820. Temminck, in the second edition of his "Manual," established the genus *Phaleris*, including two species, as he thought, but really three, as *A. tetracula* is the young of a third species and not of *psittacula*, as supposed by him. The three species are *pygmæus* (= *cristatellus* TEMM., *l. c.*); *psittaculus* and *cristatellus* PALL. (= *tetraculus* TEMM., *l. c.*) The latter is already the type of Merrem's *Simorhynchus*, leaving for *Phaleris* the other two, *pygmæus* and *psittaculus*.

1826. It shall here only be remarked in passing that Boie† in this year restricted the genus *Phaleris* to *pygmæus* (*cristella* TEMM. (!), as he calls it), including the other species under *Fratercula*. More conclusive is that, in

* Should "*Simorhynchus* MERREM, 1819." prove to be a myth only, *Phaleris* TEMM. would stand as the name of the genus with *pygmæus* for type, while for *cristatellus* should be adopted the subgeneric term *Tyloramphus* BRANDT.

† Boie, Isis, 1826, p. 980.

1829 Kaup* created the genus *Cyclorrhynchus*† for *psittaculus*, which leaves *pygmæus* the type of Temminck's genus *Phaleris*. It may here be added that Bonaparte at last gained the same conviction. He says:‡ "Le nom de *Phaleris* doit appartenir, malgré M. Gray et comme je l'avais toujours cru, au genre dont *camtschatica*, Lepechin (*cristatella*, Temm. nec Pall.), est le type et l'unique espèce." Also Brandt came afterward to the same conclusion (see Mel. Biol., VII, 1869, p. 227, where the subgenus *Phaleris* only embraces *pygmæus pusillus*). It seems that Eschscholtz§ about simultaneously with Kaup, but certainly not earlier, named the same genus *Ombria*, but as the certain date seems to be involved in some doubt (I have seen quoted 1829 and 1831‖), and as I have no means for investigating the question, I prefer the name of Mr. Kaup as the one the date of which is beyond dispute.

The types of the other genera and the date of their names are too well known to require discussion here. They may all be tabulated thus:

1819. *Simorhynchus* MERREM. Type *cristatellus*.

1820. *Phaleris* TEMMINCK. Type *pygmæus*.

1829. *Cyclorrhynchus* KAUP. Type *psittaculus*.

1828. *Cerorhinca* BONAPARTE. Type *monocerata*.

1852. *Ciceronia* REICHENBACH. Type *pusilla*.

It will thus be seen that each of the species has received a separate generic appellation. The value of these sections can hardly be regarded as equal, some, perhaps, being only of subgeneric importance, but this does not interfere with the question of which name properly belongs to each section, inasmuch as all of them are entitled to recognition. We will therefore have three genera: *Cerorhinca*, *Cyclorrhynchus*, and *Simorhynchus*, the latter composed of three subgenera: *Simorhynchus* (=*Tyloramphus* BRANDT), *Phaleris* and *Ciceronia*.

---

* Kaup, Entwickgesch. Europ. Thierw., p. 155. "Alken mit kurzem oben wie unten bogenförmig gewölbtem Schnabel."

† Nec *Cyclorhynchus* SUNDEVALL, 1836, qui *Rhynchocyclus* CAB.

‡ Comptes Rend., XLIII, 1856, p. 645.

§ "Zool. Atlas, IV, p. 3."

‖ It seems that "part iii" was published in 1829 and "part iv" in 1831, *Ombria* consequently dating from the latter year.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
89093	1036	Bering Island.....	May 11, 1882	♂ ad.	234	.....	150	43	17	30	43
89094	1260	....do	July 11, 1882	♂ ad.	256	.....	149	45	16	31	43
89143	1471	Copper Island.....	July —, 1882	(♂)ad.	.....	.....	147	42	15	29	43
92948	2082	Bering Island.....	May 23, 1883	(♂)ad.	.....	.....	150	43	16	31	42
92950	2152	....do.....	June 5, 1883	♂ ad.	.....	11	152	47	17	32	44
92947	2157	....do.....	June 5, 1883	♂ ad.	264	0	147	41	18	30	43
89095	1261	....do.....	July 11, 1882	♀ ad.	244	.....	145	40	16	31	44
92946	2020	... do.....	May 9, 1883	♀ ad.	264	.....	145	42	18	30	43
92945	2087	....do.....	May 27, 1883	(♀)ad.	(257)	.....	147	43	15	30	43
92949	2227	Copper Island.....	July 3, 1883	♀ ad.	256	6	144	44	14	29	40

No. 89093.—Iris white. Bill salmon red; nasal shield darker, grayish brown; soft part along base of upper tomia whitish flesh color; interior of mouth whitish. Feet bluish white, tinged with yellow; on the joints a well-defined dusky spot; webs blackish, along the toes bluish white; side of tarsus and toes, as also the nails, black.

No. 92946.—For the color of the bill, which was more yellowish than any other seen before, reference is made to the colored drawing pl. *f*, immediately made from the fresh specimen. Feet bluish gray; diameter of eggs in ovary 3mm.

Before proceeding to discuss the different changes which the bill and plumage of this species are subject to, I wish to call attention to a structural feature of its bill which hitherto has passed unobserved or, at least, unrecorded. The reason why it has been overlooked for so long a time can only be explained by considering the fact that the peculiarity which I am going to describe is only tangible in fresh specimens.

Dr. Dybowski (Orn. Centrbl., 1882, p. 40) says that "in this species the soft parts at the angle of the mouth are wanting altogether." This is correct, if only the "rosette" is meant, which, indeed, is wanting in all the *Phaleridinæ*, consequently also in the present species. But it is not correct if it be understood to mean that no soft parts are situated near the corner of the mouth.

In fresh specimens there will be found at the base of the tomia of the upper mandible a soft tumor of lengthened form, commencing a little behind the posterior corner of the nostrils and following the tomia backwards, gradually becoming absorbed into the soft membrane lining the corner of the mouth. It occupies the space between the nasal shield and the tomium, and has a slight depression on the upper surface, which,

when the excrescence dries up, in the prepared skin forms a furrow. The color is white slightly tinged with flesh color, and in the fresh bird, therefore, stands out in bold relief against the surrounding parts. On the lower mandible the feathering does not entirely reach the horny part of the beak, and the intervening soft skin is also of a similar white color.

This tumor was perfectly soft in all specimens which I had the opportunity of examining, but as none of these were taken late in the season, and I have never seen a winter specimen, I am unable to say anything about its later development with certainty. In all probability, however, the surface becomes hardened towards the end of the breeding season; it then will scale off irregularly during the course of the late autumn, leaving only a small and not very prominent soft space, which again will commence to swell late in the winter, towards the approach of the propagation time, but, as remarked, this is a hypothesis only.

The shedding of the basal parts of the bill of this species is not so simple as Mr. L. Bureau has conjectured.* In fact, the basal portion is not formed by a single piece, as supposed by him, but consists of several deciduous parts. In the spring these are rather difficult to distinguish because more concealed by the adjacent feathers and more completely fused together. During the breeding season, however, the dividing furrows become more distinct and deeper, showing the following separate pieces:

1. The soft white swelling at the base of the maxillary tomia, the *tomial tumor*. Comp. pl. iv, fig. 6, and pl. v, fig. 1 *a*.)

2. The *nasal cuirass*, an irregular piece above and behind the nostrils, *not* continuous with the corresponding piece on the opposite side. (Fig. 1 *b*.)

3. A small unpaired saddle-piece riding at the base of the culmen, rising knob-like above the latter, and with the ends of its legs just touching the upper corner of the nasal cuirasses. This piece seems to correspond to the "*orlet*" of the bill of the *Fraterculinæ*. (Fig. 1 *c*.)

4. A small depressed and angle-shaped space behind and below the "orlet" and above the cuirass, between these two pieces and the feathering. (Fig. 1 *d*.)

The *tomial tumor* has already been treated of above. It partakes

* "Les parties susceptibles de se modifier par l'effet de la mue sont du reste fort simples chez le *poittacula*: elles se réduisent à une seule pièce cornée, la *cuirasse nasale* (pl. v, fig. 2) qui ne fait jamais défaut dans la famille des Mormonidés." (Bull. Soc. Zool. France, 1879, p. 50.)

much of the character of the "rosette" in the *Fratercolinæ*, and has probably a similar fate after the breeding season.

The other three pieces are distinctly and separately deciduous, as shown by the series brought home by me. It will be sufficient in the following to refer to two specimens only, No. 89095 and No. 92949, as they are fully representative. Both are females, and taken during the first part of July, at a time when the young are still in the nests.

In No. 89095 all the basal pieces are very distinctly individualized, and separated by deep grooves, the post nasal border of the "cuirass" in fact already commencing to separate from the underlying stratum. This is the bird from which pl. v, fig. 1, has been drawn.

In No. 92949, which was taken alive on the nest, containing an egg with developed young in it, is already partially moulting, as the "orlet" has fallen off, and the intermediate pieces (fig. 1 *d*) are cracked in a couple of places, while the cuirass is still firmly attached. In both specimens the anterior, constantly horny parts, are flaking off in thin and irregular chips. These being the only facts in my possession concerning the moult of the horny basal pieces of the bill, I abstain from any generalizations.

As to the moult of the plumage, I have the observation to offer that the wing feathers are moulted after the hatching of the eggs is finished. I received living specimens of this species simultaneous with those mentioned under *Simorhynchus pygmæus*. The appearance and moult of the wing feathers in these birds were so completely identical that every word applied to one species is equally applicable to the other; hence no need of repeating here what is said under the head of the latter species.

The living specimens could not be induced to take any food. They walked semi-upright when moving, like all the members of the family, and such was their position during rest, too, as I have also often ascertained when watching the free living birds; later on, when growing weaker, they would lie down on their bellies.

Their pupils were very large, and the white iris in the living bird, consequently, had the appearance of a narrow ring only. The case was reversed in the dead bird, in which the whole eye was white, with a small black point in the middle.

The pending post-ocular tuft of white feathers was kept close to the body, not forming a bristling crest. These feathers are erectile at the will of the bird, but are usually carried closed together.

The "*Bjele-bruski*," *i. e.*, the white-breasts, are common, in suitable places, on both islands, though not very numerous, breeding in steep, cracked, and inaccessible rocks both on Bering and Copper Islands, especially in those places which are called "Nepropusk," that is, steep rocks rising straight out of the sea prohibiting any passage along the beach. Such places are found near the main villages on both islands, and in both places there are nesting colonies of these birds.

They arrive in the Commander Islands about the end of April. In 1883 the first three were observed on Bering Island at the Reef Point Nepropusk on April 28. On the 2d of May they were numerous at the same place. It is especially in the early morning that these birds are seen, the best time being about 4 o'clock during the spring, and also at the same hour in the afternoon, as the rest of the day, before the breeding has begun, is passed way out at sea, and after that time in the deep holes of the rock, in which the nests are located. At the time mentioned they may be observed sitting on the rocky ledges outside the opening of the nest-cave, usually only solitary pairs, but before the breeding commences often in small companies.

Their voice is a clear vibrating whistle, somewhat resembling that of *Cepphus grylle* and *columba*.

When the full grown young have left the nest all seek the high ocean, disappearing completely from the island, and not a single specimen could be secured during the latter part of the summer. Where do they go in winter? They probably stay on the ocean further south than their allies, for while *Simorhynchus cristatellus*, *pygmæus*, *pusillus*, *Lunda cirrhata*, and *Fratercula corniculata* all were obtained during the winter, not a single Bjelebruschka was seen or heard of, nor was it ever during that season picked up dead on the beach after heavy gales.

14. Lunda cirrhata PALL.

1769.—*Alca cirrhata* PALL., Spicil. Zool., V, p. 7, pl. i, et pl. ii, figs. 1, 2, 3.—KITTL., Denkw. II, p. 205 (1858).—BOLAU, J. f. Orn., 1880, p. 132.—*Lunda c.* PALL., Zoogr. Ross. Asiat., II, p. 363 (1826).—COINDE, Rev. Mag. Zool., 1860, p. 403.—DYBOW., Sitzb. Dorpat. Nat. Ges., 1881, p. —.—*Id.*, Orn. Centrbl., 1882, p. 40.—*Id.*, Bull. Soc. Zool. France, 1883, p. 349.—NELSON, Cruise Corwin, p. 115 (1883).—STEJNEGER, Natureu, 1884, p. 54.—TURNER, Auk, 1885, p. 159.—*Mormon c.* KITTLITZ, Isis., 1831, p. 1104.—*Id.*, Kupfertaf., p. 3, taf. 1, fig. 2 (1832) —MIDDEND., Sibir. Reise, II, 2 (p. 240), (1853).—SCHRENCK, Reis. Amurl., I, p. 503 (1860).—SWINH., P. Z. S., 1863, p. 331.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 308.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 10 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 10 (1874).—TACZAN., J. f. Orn., 1876, p. 203.—*Id.*, Orn. Faun. Vost. Sibir., p. 75 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 52.—*Id.*, *ibid.*, 1882, p. 398.—

BLAKIST. & PRYER, Ibis, 1878, p. 210.—*Id.*, Tr. As. Soc. Jap. VIII, 1880, p. 179.—*Id.*, *ibid.* X, 1882, p. 88.—SEEB., Ibis, 1879, p. 21.—PALMÉN, Swed. Cat. Lond. Fish. Exh., p. 201 (1883).—SAUNDERS, Ibis, 1883, p. 348.—BLAKIST., Amend. List B. Jap., p. 20 (1884).—*Fratercula c.* VIGORS, Zool. Voy. Blossom, Orn., p. 33 (1839).—CASSIN, Pr. Ac. Philada., 1862, p. 324.—FINSCH, Abh. Brem. Ver., III, 1872, p. 82.—COUES in Elliott's Aff. Alaska, p. 203 (1875).—ELLIOTT, Monogr. Seal Isl., p. 134 (1882).

1829.—*Fratercula carinata* VIGORS, Zool. Journ., IV, p. 358.

1851.—*Sagmatorrhina lathami* BONAP., P. Z. S., 1851, p. 202, pl. 44.

1858.—*Sagmatorrhina labradoria* CASSIN in Baird's B. N. Amer., p. 904.—DALL. & BANNIST., Tr. Chicag. Acad., I, 1869, p. 309.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Chord of culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
89087	1040	Bering Island	May 11, 1882	♀ ad.	385	.....	193	64	65	35	58
92919	2074	....do	May 17, 1883	(♀)ad.	(378)	.....	191	64	58	35	60
92921	2133	....do	June 4, 1883	♀	367	10	187	59	58	33	51
92923	2562	....do	Sept. 6, 1883	(♀)ad.	.....	.....	192	58	58	36	59
.....	2561*	....do	Sept. 6, 1883	ad.	.....	.....	.....	.....	.....	.....	.....
92924	2563	....do	Sept. 6, 1883	ad.	.....	.....	193	62	60	35	58
92925	2772	...do	Sept., 1883	(♂)ad.	.....	.....	187	60	59	35	60
92926	2773	.. do	Sept., 1883	(♀)ad.	.....	.....	192	59	57	36	59
92920	1874	.. do	Jan. 19, 1883	♂ ad.	397	8	189	53	53	35	61
92922	1907	....do	Feb. 12, 1883	♂ jun.	391	23	198	62	52	36	60
.....	1924†	....do	Feb. 24, 1883	juh.	.....	.....	.....	.....	.....	.....	.....
92933	1667	....do	Sept. 24, 1882	juv.[1]	310	.....	144	43	37	37	55
92927	2771	....do	Sept., 1883	pull.[2]	.....	.....	136	44	35	33	51
92930	2564	... do	Sept. 6, 1883	pull.[3]	.....	.....	105	28	31	29	47
92928	2770	... do	Sept., 1883	pull.[4]	.....	.....	98	20	33	31	46
92929	2565	.. do	Sept. 6, 1883	pull.[4]	.....	.....	.....	.....	31	28	43

* In alcohol. † Head only. [1] Only a few downs left.
[2] One-quarter downy. [3] One-half downy. [4] Seven-eighths downy.

No. 89087.—Iris creamy white. Bill, terminal part bright salmon red, on upper mandible shaded with brownish, towards the base; basal part light olive green, the cylindrical ridge on culmen more apple-green; the angle of the mouth and the narrow, naked stripe of skin between bill and feathering, and a longitudinal stripe on the "rosette," which is of a somewhat purplish flesh color, vermillion, as is also the naked ring round the eyes. Feet vivid salmon red; soles reddish brown; nails black.

No. 92921.—Iris light grayish cream-color. Color of bill similar to foregoing, but red part of bill more orange, and the green parts, except the crest on the top of culmen, duller and more brownish; eye-ring also less bright. Feet more orange colored. Fat. Eggs swollen.

No. 92920.—Iris dirty white, with a faint creamy tinge. Bill, fore part vivid salmon red, with dark brownish shades at tip of upper mandible and between the last groove and the basal part, which is dark brown, with the tomium of upper mandible reddish anteriorly and brownish flesh color posteriorly; the brown of the lower mandible is mottled with brownish flesh color; angle of mouth orange colored, as is also the mesial furrow of the "rosette," which is light flesh color. Feet very pale salmon-red, brownish beneath. Very lean. Stomach contained a blackish brown, tar-like fluid.

No. 92922.—Iris light yellowish gray. Bill, terminal part orange-red, more brownish towards the tip; tomia dark brownish, as is also the basal part of both mandibles, which is quite soft; the "rosette" light brownish flesh color; furrows and corner of mouth dull orange. Feet whitish, with a tinge of

yellowish flesh-color, and shaded with faint greenish blue on the joints and along the toes; webs light dirty reddish brown; tarsus and toes beneath dark brown; nails black. The feathers of the ear-tuft not yet fully out, their bases still in the sheaths. Very lean.

No. 32833.—Iris dark brownish gray. Bill brownish gray, darker on the basal portion, tip blackish; the "rosette" similarly colored; naked eye-ring blackish; interior of mouth light flesh color. Feet light pearly gray, each scutellum with a brownish spot in the middle; webs, soles, and nails blackish.

No. 32838.—Iris grayish brown. Color of bill like that of the foregoing, but a little darker, especially on the upper mandible. Feet of a middle gray, with a faint tinge of yellowish olive; webs and soles blackish.

No. 32839.—Iris grayish brown. Colors only a trifle lighter than in the foregoing.

There is still great confusion and uncertainty among authors concerning the changes of plumage and bill ornaments in the two groups, *Fraterculinæ* and *Phaleridinæ*. The observations which I have had the opportunity to make in regard to the moult of the wing-feathers of the latter, and which are recorded under the head of *Simorhynchus pygmæus*, are conclusive, and sufficient as far as this group is concerned, there being no previous investigations published that I am aware of.

The moult of the wing feathers of the *Fraterculinæ* have been studied in *Fratercula arctica*, among others, by Mr. Gerbe.* The process is said to be performed in April, at the commencement of the general moult, and before the season of the propagation begins. The moult is said to take place in such a manner that the primaries are thrown off simultaneously, the secondaries following a few days after, thus reducing the wings to mere fins, and making the bird incapable of flight for several days. (Cf. Bureau, Bull. Soc. Zool. France, 1879, p. 17.)

It will be seen that this process is exactly the reverse of what I have shown to take place in the *Phaleridinæ*, in which the moult occurs after the breeding, being, besides, gradual and normal in every respect.

None of the specimens of *Lunda* or *Fratercula* collected by me, although from different seasons, were in the act of moulting, and my material of these species is therefore less conclusive than that of *Simorhynchus pygmæus*. The condition of the wing-feathers in the different specimens, however, indicate, with a probability very nearly approaching absolute certainty, that the moult of the remiges in *Lunda cirrhata* and *Fratercula corniculata* does not differ materially from that of the *Phaleridinæ*; consequently that it is a postnuptial, and *not* a prenuptial moult. This is pretty evident from the fact that my September specimens have the remiges much blacker, and fresher than those killed in May, in fact, quite new and perfect, while the female collected in the beginning of June has the remiges worn, and with all signs of being old

*Observation sur la manière dont s'accomplit la mue des rémiges chez le Macareux moine (Rev. et Mag. de Zool., 1875).

feathers, ready to be exchanged for new ones after the incubating season.

I may, therefore, be excused for doubting the correctness of the statement that there is a prenuptial moult of the wing-feathers in *Fratercula arctica*, the much more so as the material of the latter, which I have been able to examine, in no way corroborates the observation of Mr. Bureau. That the process should be so radically different in the two species of *Fratercula* is more than improbable. The question as to the moult of the remiges of *F. arctica* may yet be regarded as an open one, and ornithologists, having the opportunity of making observations should not omit them in the belief that all is known about the matter.

About the moulting of the rest of the plumage in spring the previous statements are conflicting. Bureau (l. c.) says that the spring moult is complete, while Dr. Dybowski (Orn. Centrbl., 1882, p. 40) asserts that "in spring the moult is only partial," and restricted to the outgrowth of the ornamental feathers, and the moult of the wing and tail-feathers. Whether the latter statement, about the wing and tail-feathers, pretends to be based upon actual observations cannot be ascertained, and may therefore be regarded as valueless in view of the remarks above. As to the moult of the contour-feathers, however, Mr. Bureau is undoubtedly correct, as I can testify from actual observation, only with the addition that the regular time is not in spring, but in the latter part of the winter. It may be remarked, though, that the individual variation in this respect is very great, as in so many other sea birds.

Dr. Dybowski has of late (Bull. Soc. Zool. France, 1884, p. 348) advanced another erroneous theory in regard to the moult of *Lunda cirrhata*. He states that the young of the latter in the first plumage has the under surface pure white, and that the same birds early in spring, before the spring moult, are dark all over, as are the adults. He, therefore, concludes that a moult must have taken place between these two phases, "something similar to that which occurs in the young *Tetraonidæ*" (!). In the first place, the young of *Lunda cirrhata* in the first plumage is not pure white below; they are of a light gray underneath, gradually deepening towards the chin. The shade of this gray is exceedingly variable, however; in some quite light, almost whitish; in others much deeper, corresponding to a similar variability of the intensity of the dark under surface of the adults; and of the four half-fledged young collected by me, and partly yet in the down, no two are exactly alike, while the full-grown young bird obtained in February (No. 92922) is completely inter-

mediate in color between the former and the old birds. This would indicate a gradual darkening of the first plumage of the young; at any rate, no second moult takes place before the regular prenuptial moult.

In default of a better opportunity, a curious mistake of Mr. Bureau may be corrected in this connection. He asserts, with the greatest positiveness, that the female of *Lunda cirrhata* differs from the male in being destitute of the long, pendant yellow ear-tufts (Bull. Soc. Zool. France, 1879, p. 33). This statement is completely unfounded in nature, as the female in external structure and coloration is absolutely indistinguishable from the male. I have seen thousands and thousands of both sexes during the breeding season, and they are all alike; there is not a single untufted adult bird on the rookeries at that period.*

As the same author seems to believe that the summer and winter plumage of this species are identical (Bull. Soc. Zool. France, 1879, pl. iii, fig. 3, which, though having tufts and white mask, is a "restauration" intended to illustrate the winter plumage, and p. 33, where he most positively and most erroneously asserts that the plumage of the adult male in winter is "absolument semblable à celui des noces"), a brief review of the sequence of the different plumages and their coloration may, perhaps, not be out of place.

In August and September the downy young, still in the nest-holes, become clothed with their first feathers in place of the dark fuliginous down. In this plumage, which is wholly developed before they leave the nest, the upper surface and the under tail-coverts are more or less glossy black; the sides of the head are blackish gray; under surface deep ashy on the chin and throat, fading backward into a light gray, the intensity of which differs individually to a considerable extent, darkening, as it appears, during the course of the winter. About the middle of February, earlier or later in the different individuals, according to the time when they left the egg, the first moult of the contour-

* Mr. Bureau's positiveness about this point is quite illustrative of the usual generalization of many ornithological writers. He had two specimens (apparently without authenticated dates) before him, said to be females, which had not the ear-tufts grown fully out (cf. "*aigrettes*, dont le point d'implantation est indiqué par une tache jaune paille"). And upon this extremely scanty material he boldly asserts: "Pallas, et, depuis lui, tous les auteurs que ont écrit sur cette espèce, considèrent *à tort* la femelle comme étant absolument semblable au mâle et pourvue d'aigrettes." If Mr. Bureau had taken the trouble of raising the feathers of the "tache jaune" he would have found them still in their sheaths, the yellow spot being formed by the tips of the ear-tufts in the progress of development. (Cf. Bureau, l. c., pp. 33, 34.)

feathers commences, the ear-tufts at the same time making their appearance; these are at first of an isabella-brown color, afterwards changing into pale straw-yellow, (plate ii, fig. 4). The under parts of the new plumage are darker (though never glossy), and the contrast between the under tail-coverts and the rest is, consequently, less conspicuous, but the most radical change occurs in the coloration of the face, which now assumes the white "mask," and the young of the year is now indistinguishable from the old birds as far as plumage is concerned.

As mentioned above, the material at hand seems to justify the conclusion that remiges and rectrices are not shed at this moult, but at the next one, which takes place in September (earlier or later according to circumstances), or when the incubation is finished. At this moult the long ear-tufts are thrown off, the white "mask" is replaced by blackish gray feathers; all the other feathers are likewise shed, without any change, however, in the general color of the rest of the plumage. It has also been mentioned above that the time when the moult takes place is very variable in different individuals, a fact which should always be borne in mind. On the 22d of August, 1882, I observed a single old bird, with large red bill, having already changed its mask and dropped the ear-tufts, but it was the only one in a large flock of many hundreds; on the other hand, individuals are found which have not assumed their winter plumage as late as the end of October. The adult bird in winter is represented in fig. 2, pl. i.

Parallel with and corresponding to this moult of the plumage the remarkable shedding of the basal parts of the bill takes place. Mr. Bureau has the honor of first having pointed out this fact, but for want of sufficient material he had to content himself mostly with hypotheses and assumptions, consequently falling into several errors. Dr. Dybowski afterwards observed parts of the process, but, not content with the facts observed, went on speculating, and, needless to say, consequently, also made grave mistakes. It will, therefore, be expedient to point out and correct these before proceeding to a detailed account of the process as it actually takes place.

The figures representing the heads of *Lunda cirrhata*, and accompanying the two articles of Mr. Bureau are not only crude, but in several points absolutely erroneous, it being sufficient to compare fig. 4 of pl. v, Bull. Soc. Zool. France, 1877, with those on pl. iii, *op. cit.*, 1879, particularly the grooves, the crest, and the lower end of the horny

"*orlet*,"* not to speak of the color of the deciduous parts which are painted red instead of green, and of the "rosette," which is made bright yellow instead of flesh color.

Mr. Bureau asserts (*op. cit.*, 1879, p. 39) that the mental cuirass is uniform in color with the rest of the under mandible, so that its existence is hardly suspected when the bird is in full summer or winter dress. From my drawings and descriptions it will be seen that such is not the case. That piece is *always* differently colored from the rest of the mandible (except in the young birds), the latter being always red, while the former is green in summer and deep brown in winter. It is not more correct when he says (*l. c.*) that the "atrophic triangle" is so much reduced that its retraction does not sensibly modify the outline of the inferior mandible. A glance at my figures on pl. i shows at once that the lower outline of the mandible is considerably different in summer and winter, the gonydeal angle being, in fact, situated at the middle of the mandible during the latter season, while in summer the corresponding point is placed within the basal third of the mandible.

*I follow Mr. Bureau's nomenclature of the different basal pieces as closely as possible. The following is a synoptical table of his terms with reference to the figures on pl. iii, B. S. Z. F., 1879, together with the equivalents employed by Dr. Elliott Coues in a review of Bureau's discovery in the Bull. Nutt. Orn. Cl., 1878, p. 89, and by Dr. Theo. Gill in an article of similar object in Baird's "Annual Record of Science and Industry" ("Harper's"), 1878, p. 480. In the last column will be found the English term corresponding to the French appellation, which I propose to adopt.

B. Z. S. F., 1879, pl. iii.	French appellation by Mr. Bureau.	Terms employed by Dr. E. Coues.	Terms employed by Dr. Th. Gill.	Terms employed in the following account.
Figg. 1 and 4 *a*	*Ourlet corné*	Boss	Basal lamella	*Horny orlet.*
Figg. 1 and 4 *b*	*Cuirasse nasale*	Nasal buckler	Supranasal saddle	*Nasal cuirass.*
Fig. 4 *c*	*Lamelle sous-nasale.*	Subnasal lamellæ.	Subnasal lamellæ.	*Subnasal lamellæ.*
Figg. 1 and 4 *f*	*Listré corné*	Horny selvage	Mental lamellæ	*Horny selvedge.*
Figg. 1 and 4 *g*	*Cuirasse mentonnière.*	Mental buckler	Inverted saddle	*Mental cuirass.*
Fig. 1 *i*	*Rosace*	Rosette		*Rosette.*
Fig. 3 *a'*	*Ourlet membraneux.*	Membranous boss.		*Membranous orlet.*
Fig. 3 *b'*	*Membrane nasale.*	Nasal membrane		*Nasal membrane.*
Fig. 3 *f*	*Listré membraneux.*	Membranous selvage.		*Membranous selvedge.*
Fig. 3 *g'*	*Matrice mentonnière.*	Mental matrix		*Mental matrix.*
Fig. 3 *b''*	*Cimier membraneux.*			*Membranous casque.*

The horny subcylindrical protuberance at the base of the culmen is not marked by a distinctive letter on the figures; in the text it is called "*cimier corné*," a term here transcribed by "*horny casque.*"

Dr. Dybowski's mistakes are more serious. In the article in Ornith. Centrbl., 1882, he says *positively:* "During the further development of the moult the entire fore part of the bill scales off and assumes a dark color; the entire head becomes covered with black feathers, and the iris becomes blackish brown." And to strengthen his assertion he adds in a foot-note in this very place: "In my collection all these stages of moult are represented by splendid specimens."*

Nevertheless, this startling discovery of the shedding of the anterior part of the bill, too, is not at all based on facts, being a mere supposition, young birds having been mistaken for adults. Dr. Dybowski himself has afterwards become doubtful about this point, which, at first, was asserted with so great positiveness. His doubts are expressed thus in the Bull. Soc. Zool. France, 1883, p. 349: "I am convinced that the worn bill cannot obtain the form it has in spring without having first changed its *entire* superficial sheath. Therefore, *although I do not possess such a sheath*, I persist in my conviction that the bill is wholly shed,"† (italics mine). What has become of the "splendid specimens of *all* the stages of shedding"? It is, then, clear that the "discovery" is not founded upon observation but upon a "conviction." The mistake rests upon the circumstance that he got young birds, some with light and others with dark colored undersides; the latter he took for adults, not taking into account that the former were obtained in November (B. S. Z. F., 1883, p. 348) while the latter were taken later in winter and spring (Orn. Centrbl., 1882, p. 28).

The wear and tear of the anterior part of the bill is overcome and remedied by the same process as in other birds, the external horny layers flaking off irregularly, substituted by the successive growth of the underlying ones. There is no need of assuming a regular shedding of that part, and most certainly it does not take place; conclusive evidence, besides, is furnished by No. 92920 (pl. i, fig. 2).

The statement of Dr. Dybowski that the iris of the adults changes from whitish to blackish brown is a result of the same confusion of the adults and young, and so is the assertion that the color of the whole bill of the adults is dark in winter.

---

* Im weiteren Verlauf der Mauser schält sich der ganze vordere Theil des Schnabels und bekommt eine dunkle Farbe; der ganze Kopf bedeckt sich mit schwarzen Federn und die Iris wird schwarzbraun. In meiner Collection sind alle diese Mauser-Stadien durch practvolle Exemplare repräsentirt. (*L. c.*, p. 40.)

† Je suis persuadé que le bec usé, ne peut parvenir à sa forme de printemps qu'après avoir changé en entier son fourreau super Ainsi donc, quoique je ne possède pas de fourreaux pareil, je persiste dans ma conviction que le bec mue en entier.

Other misstatements as to the color of the naked and soft parts have originated in describing them from dried skins, or at least from specimens not absolutely fresh. This is evident, for instance, where the bill and feet of the young birds are described as black (Orn. Centr., 1882, p. 29: "Beine immer noch schwarz"), and the rosette of the adults as "pæonia-red."

Another mistake is probably due to lack of material, the stage in question *not* being represented in the "splendid" series. I allude here to his statement (Orn. Centrbl., 1882, p. 30) that when the horny orlet falls off it is replaced by *black* feathers. The fact is that the feathers which are growing out when the orlet drops off are *white*, as my specimens conclusively prove; this part drops off before the white face-mask has changed to black; when that change takes place then the white feathers on the "membranous orlet" are first exchanged for black ones.

The series of plain and colored drawings which accompany this account were carefully prepared on the island from specimens perfectly fresh and still in the flesh; they were not merely sketches, but *finished* on the spot, and have not been touched since. I claim for them the merit of being true in outline and color. They illustrate most of the different stages of development and transformation, and, in consequence, are frequently referred to in the following, as they certainly convey a better idea of the specimens than the most explicit description; besides, the descriptions have been given above under the remarks following the "list of specimens collected," p. 44.

The color and shape of the bill of the downy young (pl. ii, fig. 1) is exactly that of the more developed young represented in the same plate, fig. 2. Passing through the stage of fig. 3, the bill grows gradually during the winter, simultaneously reddening in the anterior part. Birds hatched very early will have attained a development corresponding to fig. 4 at the middle of February, while late birds at the same time will not have advanced farther than the stage represented by fig. 3. The next step is the swelling and growth and subsequent hardening of the basal parts accompanied by their change of color into an olivaceous green. At the same time the semilunar vertical grooves on the anterior part of the upper mandible commence to be visible. It seems as if they are formed by a constant flaking off, as the superficial corneous layer of the grooves is always more or less lacerated, detached, and in course of scaling, causing the whitish coloration of the grooves. When this

process is finished the young bird is essentially like the adults, but whether partaking in the breeding during the first year I cannot say with certainty. I am inclined to think, however, that the still immature birds remain on the high sea away from the rookeries during the breed-

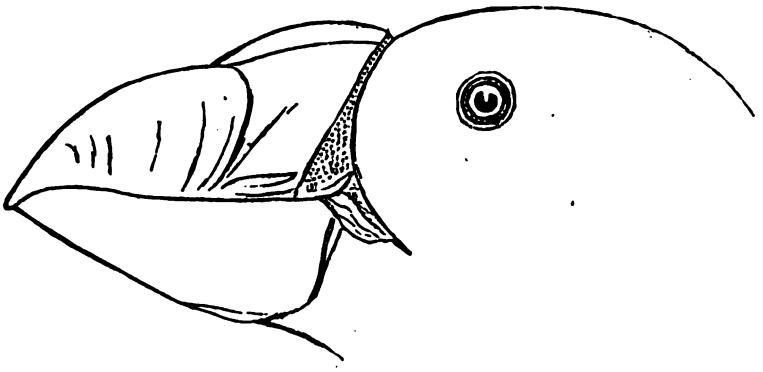


FIG. 1.—*Lunda cirrhata*, jun. Copper Island, July 30, 1883.

ing season, for I never saw a breeding bird like that shot by me on Copper Island on the 30th of July (fig. 1, text), which even at that late date had the grooves only just perceptible; it was shot a distance off shore, and judging from its conduct and its perfect plumage at that

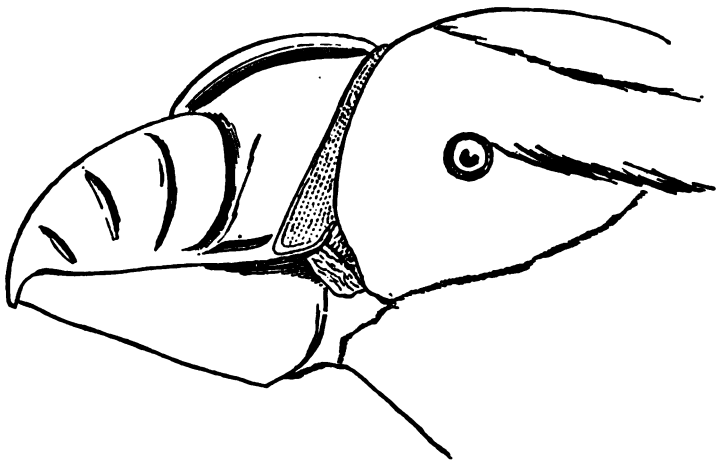


FIG. 2.—*Lunda cirrhata*, jun. Bering Island, June 4, 1883.

time was not engaged in the incubating business. In all probability this is only a very late bird, holding the same relation to pl. ii, fig. 3, as does fig. 2, text, to pl. ii, fig. 4. But while I feel quite sure that this bird and others of the same stage did not breed that season, I

am not so certain in regard to fig. 2, text. That bird was picked out of a lot of similar ones which I examined when visiting the rookery on Toporkof Island on the 4th of June, 1883. Here are the remarks concerning these specimens, written down on the spot: "The bill is considerably shorter and lower, and the casque is arched and not straight as in the old birds; the colors are less bright, the red being paler and more orange, and the green more olive, the casque alone being clear apple-green; the rosette is less vivid, the red especially less conspicuous and more pinkish; the naked eye-ring is narrower and more dull colored, while the feet are more orange." These were evidently birds of the foregoing year, and their presence on the rookery so late would seem to indicate that they were going to breed that season, an assumption the more probable, as the eggs in the ovary were quite swollen. It may be, therefore, that the early-hatched birds breed the next season, while those reared late in the year—and downy young are found in the nests as late as the end of September—pass the first summer without partaking in the reproduction.

Towards the end of the breeding season, and a little before the moulting of the contour-feathers commences, the green color of the deciduous parts becomes more brownish, the rosette shrinks, becoming rather pinkish of color, the edges of the different pieces are raised and hard, and the grooves between them deepened. The distinction between the apical and basal parts of the lower mandible, which until then has only been indicated by the difference in color, is now clearly marked by a sharp and deepened line.

The first part to come off is the horny orlet, the process usually beginning in such a way that the orlet bursts on the culmen where it is quite narrow, and much more so than shown in Bureau's figure (fig. 4*a*, pl. iii, B. S. Z. F., 1879), and from the culmen the two detached halves of the orlet flake off downward to the tomia, exposing the membranous orlet, which is now covered with rows of about 1^{mm} long *white* feathers. Next comes the nasal cuirass, which, unlike the former, first detaches itself along the upper margin of the nostrils. This nasal cuirass is separated from the adjacent pieces all around by deep furrows, except at two narrow points behind and in front of the nostrils, and in loosening, these narrow bridges break irregularly. Simultaneously the basal part of the mandible is shed, first loosening along the feather border, then along the tomia until it finally breaks at the lately formed line across the mandible. In Bureau's figure the horny selvedge is repre-

sented as a well defined and separate piece; I may therefore remark that in all my specimens the lower half of this piece is connected with the mental cuirass, and that they are shed together; it must be remarked, however, that any violence during the process is apt to break the different parts irregularly. As to the subnasal lamellæ my material does not indicate any shedding, and as they are colored reddish like the persistent part of the bill, and not greenish as the deciduous pieces, I am inclined to think that they are not shed at all.

These changes occur during the months of September and October, some individuals commencing as early as the beginning of the former, while others are not yet through at the end of the latter.

The bird now looks like fig. 2, on pl. i. It will be seen that neither is the anterior part shed, nor dark colored, nor the iris changed to blackish brown, the specimen figured having been obtained on the 19th of January.

In the early part of the next spring the soft parts again become hard and change color, and as soon as the breeding season is at hand the fully adult bird looks like fig. 1 on pl. i.

It may be added that the birds take to the open ocean shortly after the shedding commences, remaining far from any land until the vernal transformation is finished. Only severe storms or excessive cold bring them in winter near the shore.

I observed a few individuals which had four grooves on the anterior part of the maxilla, but out of a hundred birds I found only two or three. These were probably very old birds.

One specimen, No. 92924, shows trace of corresponding grooves on the lower mandible.

The "*Toporok*" (plur. "*Toporki*"), together with the "*Are*" (*Uria arra*), is the most numerous of the many species of the *Alcidæ* on the islands, and as both are also the largest in size, they become of eminent importance to the natives as sources of fresh meat. This is especially the case on Copper Island, the area of which is more limited, and where the inhabitants have fewer facilities for preserving the meat of the fur-seals slaughtered during the short season of the summer. To them the adults, young, and eggs are most welcome additions to their bill of fare, and, indeed, I myself was very often gratified by a good meal of fried "Toporki," for the meat, although very dark, is by no means distasteful. I remember occasions when I thought I had never eaten anything better, when fur-

seal-tongues and toporok-breasts were esteemed higher than deer-tongues and goose-breasts are to-day.

But it is not only for food that these birds are used. The skins are carefully flayed off, and made into wide and long, very warm and nice garments, the so-called "*parka*," with the feathers turned inside. About fifty skins are required for one "parka." In order to remove the fat from the skins, they are chewed over and over again by the women and children until all the fatty matter has been chewed out, that being their method of tanning. These "parki" are rather easily torn, but are extremely warm and light, as I can testify from my own experience. Dressed in one I could go driving in a dog-sledge in the severest cold wtihout feeling any inconvenience, and its lightness would allow me to keep it on when strolling about, away from the sledge, hunting ptarmigans or other ornithological and gastronomical objects.

The yellow feathers of the long ear-tufts are in great demand for decorative purposes. The seams of a fine "*Kamlejka*" (rain coat made of seal-guts) is often tastefully adorned with them.

With the beginning of May these birds commence making their appearance on the coasts of the islands,* looking out for their old homes, but for a while they stay mostly on the water, not far from land, until the nests are taken possession of in earnest, which happens about the beginning of the second week of June.

The natives, heartily tired of their winter food, the salted seal meat, look forward to the arrival of the Toporki with great impatience, and as soon as a sufficient number are observed in the neighborhood of the old rookeries parties start off in order to catch a good supply for food and clothing, advantage being taken of the peculiar habits of the birds

I shall in the following attempt a short description of such an excursion:

On a bright afternoon in May—and at that season really some fine, bright days occur, even on the Commander Islands—we started, a gay picnic party, consisting mostly of Aleuts and their wives or lady friends,

*Dr. Dybowski states that they do not arrive on the coast of Kamtschatka before the second week of June ("Ende Mai. a. St.," Orn. Centrbl., 1882, p. 28). That may be, but it is certain that they appear about five weeks earlier at the islands, for when, in 1882, I landed on Copper Island on the 5th of May Toporki were already plentiful, and in 1883 they were noted as arrived at Bering Island on the 7th of the same month. In fact the first egg was found on June the 12th, which corresponds to the last of May, "old style."

for the small island Toporkoff, about three miles off from the village. During our passage out only few birds were seen, as it was no "land day," but I was assured that they would be in on the following morning. The Toporki and their allies show during this season, previous to the breeding, the peculiarity of appearing regularly, as it seems, in great abundance near shore on one day, while next day they have all disappeared, staying away on the high sea for two days, when they again take a "land day." The natives had calculated that the following day would be such a regular land day.

The afternoon passed pleasantly; some were out fishing, the younger members of the party were playing ball, while I was busily engaged in securing specimens of *Troglodytes pallescens*, *Acanthis linaria*, &c., besides odds and ends of plants, insects, mollusks, and crustaceans.

Toporkoff, which has received its name on account of being a rookery of the "Toporki," is a small island consisting of a level plateau about 30 feet above the surface of the sea, rising abruptly from a 50 to 200 feet broad, sandy or rocky beach. The upper surface of the plateau is covered with a thick, hummocky sod, which in every direction is perforated by the numberless holes dug by the "Toporki" and used by them for dwellings to rear their young in.

Water birds were rather scarce near the island, though at a distance large flocks, like black patches, were seen resting on the sea. Now and then a solitary Toporok would cross overhead in its straight flight; a few cormorants (*Phalacrocorax pelagicus*) aired their wet wings on the outlying rocks, stretching their long necks in all directions; noisy gulls (*Larus glaucescens*) flew up and down, screaming and scolding at the intruder.

Evening set in, and the picnic party returned, leaving us men with the bajdarkas. Toporki crossed the island more frequently, but not in such numbers that it was thought worth while to try catching them. A camp fire was started for the preparation of the tea, and soon the indispensable "samovar" was humming its cheerful tune. My Aleuts were unusually silent and dull, and we soon crept into the hull of the bajdarkas, a snug and rather comfortable bed, though smelling considerably from seal-oil, that peculiar smell which characterizes almost everything on the islands, and to which the outsider will have to adapt himself, if he wants to feel comfortable during his sojourn on the seal islands.

The ornithological spectacle at daybreak the following morning was quite different from what it had been the foregoing day. Hundreds and thousands of *Lunda cirrhata* crossed and recrossed the island, coming from all directions, and disappearing on the opposite side, in order to return again and again. A wonderful sight! The black birds, with their conspicuous white face-mask, the long and floating yellow ear-tufts bent like the horns of a ram, and the large green-and-red-colored beaks and red legs, looked more like fantastical creatures of the tropics than inhabitants of the less extravagant north. Their flight seemed to have no particular aim except to view and review the spot where they were going to take up their summer abode, for they flew singly upon their straight courses, no one taking notice of the others. Like black specks they rose from the horizon heading for the island; the nearer they came the bigger they grew, until they passed over us, disappearing as specks again on the other side, and when first started nothing seemed to be able to bring them out of their straight course. These clumsy looking, puffy birds possess, nevertheless, a very rapid flight, so that at the first acquaintance one is rather apt to shoot behind them, but they do not rise very high in the air, especially when passing over the upper plateau of the island.

The natives take advantage of these peculiarities, and their device for catching the Toporki is based upon the apparent difficulty of the bird to make a sudden turn in its straight flight.

A piece of wide-meshed net-work stretched on a hoop, about 4 feet in diameter, fixed to a light pole, 10 to 12 feet long, is the instrument used in catching the Toporki, by suddenly throwing it in the way of the bird, who flies directly into it, and thus falls to the ground and is captured.

When I turned out the Aleuts were already in their places waiting for the rush of the birds, which had not yet begun. They were scattered pretty evenly around the island, seated on the edge of the bluff. Their immovable figures, wrapped in the warm "parka," or the lighter "kamleika," were clearly visible against the gray western sky, and now with the dawning day we discern the net at their side, but, what is more surprising, each one surrounded by a small flock of Toporki. These stretch their necks and point with their bills straight up in the air in quite an unaccountable manner, remaining so long in that rather unnatural position that we become suspicious. A closer

inspection reveals that these are only decoys, empty skins held in position by a stick protruding between the jaws and with the other end thrust into the ground.

Before long the sea and the horizon become lively with birds, and soon the sky above us literally swarmed with these red-and-green-beaked, white-masked, yellow-horned masses. It was "land-day," indeed! I only wondered that they did not suffer collision with each other during their airy sailing, for they were thick as May-flies round an electric light, and flew both straight and rapid.

When a Toporok crosses overhead of an Aleut he suddenly raises his net; the bird, unable to turn aside, runs into it with a clash, falls to the ground, and in a twinkling is added to the heap of other unfortunates with broken necks.

When full day has set in this sport is at an end, as then the birds fly higher, and now comes the moment for me and my gun, for we, too, want fresh Toporki for dinner!

To the accompaniment of the buzzing breakfast-"samovar," I wrote down my memoranda on fresh colors, individual variation, moulting, &c., surrounded by hundreds of specimens, selecting desirable objects for skinning, and preparing colored sketches of the fresh colors of bills, eyes, &c., before they fade away and dry up.

After a successful hunt we then returned in the "bajdarkas."

The eggs are white, without gloss, usually with faint lilac spots, which are more numerous in a wreath around the blunt end. Owing to the location of the nests in holes dug in the soil, the eggs are always more or less stained.

Dimensions of eggs.

U. S. Nat. Mus. No.	Collector's No.	Locality.	Date.	Long diam.	Short diam.	State of incubation.
				mm.	mm.	
21788	2245	Copper Island	July 12, 1883	71	50	Fresh.
21789	2246	do	July 12, 1883	68	48	Do.
21790	2283	do	July 18, 1883	68	45	Do.
20791	2284	do	July 18, 1883	71	50	Cont. small embryo.

15. Pratercula* corniculata (NAUM.).

1768.—*Alca arctica β*, GMEL., Syst. Nat., I., 2, p. 549.

1821.—*Mormon corniculata* NAUMANN, Isis, 1821 (p. 782, taf. 7, figg. 3, 4).—KITTLITZ, Kupfertaf., I, p. 3, taf. 1, fig. 1 (1832).—*Id.*, Denkw., I p. 301 (1858).—MIDDEND., Sibir. Reise, II, 2, p. 240 (1853).—CASSIN, Pr. Acad. Philada., 1862, p. 324.—SWINH., P. Z. S., 1863, p. 331.—DALL & BANNIST., Tr. Chic. Acad. I, 1869, p. 308.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 10 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 10 (1874).—TACZAN., Orn. Faun. Vost. Sibir., p. 74 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 52.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 179.—*Iid.*, *ibid.*, X, 1882, p. 89.—PALMÉN, Swed. Cat. Lond. Fish. Exh., p. 201 (1883).—SAUNDERS, Ibis, 1883, p. 348.—BLAKIST., Amend. List B. Jap., pp. 29, 31 (1884).—SEEB., Ibis, 1884, p. 174.—*Fratercula c.* KITTL., Denkw. Reise, II, p. 224 (1858).—*Id.*, Journ. f. Orn., 1858, p. 389.—FINSCH, Abh. Brem. Ver., III, 1872, p. 82.—COUES, in Elliott's Aff. Alaska, p. 202 (1875).—DYBOW. Sitzb. Dorp. Nat. Ges. 1881, p. —. *Id.* Orn. Centrbl., 1882, p. 40.—ELLIOTT, Monogr. Seal Isl., p. 133, (1882).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 171.—TACZAN., Bull. Soc. Zool. France, 1882, p. 398.—NELSON, Cruise Corwin, p. 115 (1883).—TURNER, Auk, 1885, p. 159.

1826.—*Lunda arctica* PALL., Zoogr. Ross. As. II, p. 365 (*part*).—*Fratercula a.* BUREAU, Bull. Soc Zool. France, 1879, p. 23 (!).

1831.—*Mormon septentrionale* KITTLITZ, Isis, 1831, p. 1105.

1835.—*Mormon glacialis* AUDUB., Orn. Biogr., III (p. 599, pl. 293, fig. 1) (*nec* TEMM., 1820).—*Fratercula g.* VIGORS, Zool. Voy. Blossom, Ornith. p. 33 (1839).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Chord of culmen.	Tarsus.	Middle toe with claw.
					mm	mm	mm.	mm.	mm.	mm.
92930	2076	Bering Island.....	May 26, 1883	(♂)ad.	(341)	183	70	55	29	30
89068	1209	.....do	June 14, 1882	♂ ad.	.....	173	61	50	30	49
89068	1063	.....do	May 21, 1882	♀ ad.	.....	177	62	51	32	52
89090	1136	..... do	May 31, 1882	♀ ad.	342	173	61	51	29	49
89091	1178	.....do	June 8, 1882	♀ ad.	343	188	65	50	32	51
92982	1920	.....do	Feb. 24, 1883	♂ jun.	357	174	64	40	31	51

No. 89089.—Iris, dark gray with a tinge of brownish. The soft "eye-horns" brownish black with a delicate, silky gloss; naked eye-ring vermilion. Tip of bill, until between second and third groove, salmon-red along culmen and gonys, elsewhere brownish red; base of bill very light and bright lemon yellow, the callosity at the corner of mouth bright orange, as is also the interior of the mouth and the tongue. Feet colored between salmon-red and flesh-color; webs scarcely darker; under side of tarsus and of outer and inner toes brownish; that of the middle toe and of the webs only a little deeper red than the upper surface; nails brownish black.

No. 89090.—Iris dark brownish gray. Bill: Tip blood-red, brownish behind and below, border of hind groove almost black; basal part light lemon yellow; callosity at corner of mouth bright orange. Eye-ring vermilion; horn above and below the eye brownish black with silky gloss. Feet reddish orange, outside paler, livid; soles reddish brown.

No. 89091.—Iris brownish gray.

No. 92982.—No detailed description of the color of the bill made, as it was drawn and painted immediately (see pl. lii, fig. 3). Feet whitish flesh-color tinged with bluish; webs brownish gray, tarsus and toes below blackish brown. Stomach empty. Very lean.

* The application of the generic name, as indicated in Coues's second check-list, seems somewhat far-fetched (in the second edition of the "Key" he asks, "What appli-

Dr. Dybowski is only partly correct when he (Orn. Centralbl., 1882, p. 40) describes the feet of this species as "orange yellow" (*orangegelb*). The color varies considerably, being much paler before the breeding season, so pale even that it often approaches dirty flesh-color. The brightest color is assumed in May or June, during which months the feet are of an intense red, in some cases tending to salmon color, in others to orange; but out of the many scores of these birds examined by me at that time not a single one had the feet yellower than a rich "reddish orange," this being the extreme and the exception. The soles are usually lighter or darker reddish brown. It is only after the breeding season that the feet of the adult birds assume an orange yellow color, a change which takes place in the latter part of July, at which time the webs are even brownish orange, this color lasting until late in the following winter. In an old bird obtained on February 24, 1883, (L. S. No. 1915) I find the colors described as follows: "Feet orange yellow, webs more reddish; tarsus and toes below dark brown." In the young bird during winter the feet are almost white, with brownish gray webs.

I must also add that I never saw an iris which could be termed "whitish gray or brownish white" (*weisslich grau, oder bräunlich weiss* Dybow., *l. c.*) It was invariably rather dark brownish gray; in fact so dark as to almost do away with the color of the iris as a distinctive character of this group of birds.

From my plate and the description of the fresh specimens, as given above, it is clear that the coloration of Bureau's figure of the head (Bull. Soc. Zool. France, 1879, pl. ii) is entirely erroneous. His "Figure idéale de l'adulte en hiver" (*l. c.* fig. 2) is better, although the outlines of the

---

cation ?"). *Fratercula* is probably a comic diminutive of *frater* in the sense of a member of a brotherhood of monks (friars), on account of its plumpness of figure and its ridiculous grave air. This supposition is confirmed by analagous vernacular names in different languages. Faber tells us that *Fratercula arctica* in Iceland is often called "Prestr" (priest), "seiner Gebährden auch seiner Farbe wegen" (Isis, 1827, p. 664). Compare also the French name *Macareux moine* (moine = monk), and the Italian *Fraticella*. Naumann quotes as German vernaculars "*Das Brüderchen, der Mönch*," though these may possibly have originated in translation, the former from the Latin, the latter from the French.

The German name for the Sea-Parrots, "*Maskentaucher*" or "*Larventaucher*," does not apply to the bill as the "mask," but to the whitish patch of the face, for which Naumann expressly uses the word "Gesichtsmaske." The generic name *Larva* has the same application, and *Mormon* is only the Greek equivalent for *Larva*; "*larvata*" is a common designation for a bird having the face colored differently from the other parts of the head. Of course, "Larventauscher" is a mere misprint (cf. Coues, Bull. Nutt. Orn. Cl., 1878, p. 88).

soft parts are somewhat wrong, as will be seen by a comparison with my figure drawn from the fresh specimen. But he commits a rather curious mistake in the same figure by retaining the summer coloration of the plumage, when it is intended to show the bird as it is in winter. My figures, both of the adult and the young, obtained February 24, 1883, are taken from the fresh specimens, and are so accurate and detailed as to make a special description of them superfluous. His suppositions as to the shedding of the different parts is undoubtedly correct.

A few corrections to his article (*op. cit.* pp. 28–31) are necessary, however. It is superfluous to call attention to the erroneous description of the color of the bill which is given as "orangé, unicolore."

"Sommet de la tête d'un noir grisâtre" (*l. c.*, p. 29, top of head of a grayish black), gives an entirely wrong idea of the color of the cap, which is blackish *brown*, contrasted strongly and in a well-defined straight line across the nape with the glossy black of the neck and back.

The term "horns," for the deciduous caruncles above and below the eyes is very misleading. Being hard in the dried specimen, the general impression is that these "horns" are "horny" in the living bird, and that this is also the opinion of Mr. Bureau is evident from his expression, "deux appendices *cornés*, allongés, libres, *en forme de cornes* d'un gris de fer." This is a mistake, however, for the "horns" are only soft and flexible caruncles or wattles, covered with a delicately glossed skin, as if made of silk, which, moreover, is not "d'un gris de fer," but of a decided blackish brown. The "horns" are soft as late in the season as I had opportunity of examining specimens. I have no note, however, of any later than the beginning of August.

The winter plumage differs from that of the summer bird only in the coloration of the sides of the head, which at that time are blackish in front of and round the eyes, shading into gray behind and below.

The young in the first plumage are similarly colored, only somewhat duller, and the color of the under parts is absolute pure white, differing in that respect from the young of *Lunda cirrhata*, which is always grayish, or washed with this color, at least. The downy chicks are still easier to distinguish, for in *cirrhata* they are uniform black fading into a smoky brownish, while the pullus of *corniculata* has the downs of the breast and abdomen pure white, in strong contrast to the black of the other parts, consequently like the chicks of *Fratercula arctica*.

On the Commander Islands the name "*Ipatka*," or "*Ipatok*," as it is pronounced on Copper Island, is exclusively used for this species,

which here is never called "*Toporok*," a name reserved for *Lunda cirrhata* only.

The Pacific or Horned Puffin is not very common on the islands as compared with the Tufted Puffin (*Lunda*), probably because suitable breeding places are scarce, as they require rather deep holes in rocks or between stones. A few pairs, or where the locality offers more nesting opportunities, some small colonies are found scattered among the rookeries of the other water birds, sometimes higher, sometimes lower than the other species, sometimes in the midst of them, according to where the holes and cracks in the rocks are situated.

As stated above, the nest-holes are found in the rocks, and I never saw a single pair breeding in a hole dug out of the soft ground, as is often the case with *F. arctica*, and invariably, so far as my experience goes, with *Lunda cirrhata*.

The voice is an angry *orrrr* somewhat similar to that of *Uria lomvia arra*.

Their attitude, while walking or standing, is upright, although not so straight as in *Uria*. While walking they touch the ground with the toes and webs only, but rest on the whole sole when sitting.

Superfamily LAROIDEÆ.

Family LARIDÆ.

16. Larus glaucescens NAUMANN.

1840.—*Larus glaucescens* NAUMANN, Naturg. Vög. Deutschl., X, p. 351. (*nec* BRUCH 1853?).—KITTL., Denkw., I, pp. 359, 2?5, 335.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 304.—BAIRD, Tr. Chicag. Acad., I, 1869 (p. 842).—FINSCH, Abh. Brem. Ver. III, 1872, p. 83.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 8 (1873)—*Id.*, Avif. Aleut. Isl. west Unal., p. 9, (1874).—SWINH. Ibis, 1874, p. 163.—BLAKIST. & PRYER, Ibis. 1878, p. 217.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 189.—*Id.*, *ibid.*, X, 1882, p. 103.—SEEB. Ibis, 1879, p. 23.—BEAN, Pr. U. S. Nat. Mus. 1882, p. 168.—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 70.—TURNER, Auk, 1885, p. 158.

1853.—*Larus* (*Glaucus*) *glaucopterus* BRUCH, Journ. f. Orn., 1853, p. 101.—KITTL., Denkw. I, p. 335 (1858).

1873.—*Larus fuscus* PELZELN, Verh. Zool. Bot. Ver. Wien, 1873, Sep. p. 8 (*fide* PELZELN *in litt.*) (*nec* LIN.).

1882.—? *Larus borealis* TACZAN., Bull. Soc. Zool. France, 1882, p. 397 (*nec* BRUCH).

1883.—*Larus leucopterus* NELSON, Cruise Corwin, p. 106 (*part* ? cfr. Stejneger, "The Auk," 1884, p. 360).

Quite a considerable amount of confusion has existed in the nomenclature of this species, caused by Bruch, who originally (1853) named a

bird *glaucescens* "Licht.," which was not the *glaucescens* of Lichtenstein (!)* Lichtenstein's name is only a museum name which would take no precedence over Bruch's *glaucescens* of 1853 if no description had been published prior to that year. In that case the species would have to stand as *glaucopterus* Bruch (ex Kittlitz in MSS.), 1853.

Fortunately enough we have a much earlier description of the type of the Berlin Museum, and that a description which is much superior to any of the descriptions or diagnoses of Bruch or Bonaparte.

This description is found in Naumann's Naturgeschichte der Vögel Deutschlands, X, p. 351 (1840), and as this original and excellent characteristic of *L. glaucescens* has been entirely overlooked by all authors up to the present day, I propose to give a full translation of Naumann's remarks. He says:

"A much nearer ally [to *L. glaucus*] with much greater similarity [to it than to *L. leucopterus*] is a species of the same size, the *L. glaucescens*, of the Berlin Museum, from North America, where it seems to represent our *glaucus*. Although the size and shape (of bill and feet also) of both are very similar, still *L. glaucescens* in the adult plumage is easily distinguishable by the different color and pattern of the primaries, these being uniform bluish ashy gray, with large snow-white tips, the border of the two colors being very distinctly marked across the feathers; the white tips consequently are much more conspicuous than in *glaucus*, in which they pass gradually into the gray color, showing in fact the same pattern as in *L. marinus*, only that in the latter those parts are black which in *L. glaucescens* are but bluish ash. Besides, the mantle of the old *L. glaucescens* is of a somewhat more saturated gull-blue (similar to the color of *L. argentatus*), while in *L. glaucus* it is much lighter or more whitish. The young *L. glaucescens* is likewise distinguishable by the darker brownish gray of the primaries, the white tips of which, however, are less distinctly separated from the dark color, although much more so than in the young of *L. glaucus;* the spots on the mantle are larger and somewhat darker though more blended into the light edges of the feathers, the whole region thus being more broadly but at the same time more indefinitely blotched." To this he adds in a foot-note: "I am ignorant of any minute description or figure of this beautiful large species which in coloration is intermediate between *L. marinus* and *L. glaucus*. It belongs to the more recent discoveries."

Thus *Larus glaucescens* is "hunted down" to the original description!

* Bruch's *glaucescens* of 1855 is the same as Lichtenstein's, however.

Mr. H. Saunders, having examined the type of Lichtenstein's *L. chalcopterus*, 1854 (which, however, is only a nomen nudum), pronounces it indentical with *leucopterus*. What it is, may be regarded as being of little consequence, however, unless it is the same as *Larus* (*Laroides*) *chalcopterus* of Bruch, 1855, which Saunders queries. But Saunders, when putting "*chalcopterus* Bruch" in the synonymy of *leucopterus*, and "*Larus* (*Glaucus*) *glaucescens* Bruch 1853 [*nec* 1855]" in that of *glaucescens* Licht. [=*gl.* Naumann], is certainly wrong, for there can be no doubt that *chalcopterus* Bruch, 1855, and *glaucescens* Bruch, 1853, are the very same thing, whatever may be their relations to the same names as applied by Lichtenstein to specimens in the Berlin Museum. To prove this conclusively I reprint here alongside each other the two monographs of Bruch as far as these names are concerned:

Journal für Ornithologie, 1853, p. 101.

III. *Glaucus*. Silber-Möve.

10) *Consul* Boie; *glaucus* Brünn.
Nord Europa und Grönland.

11) *Glaucopterus* Kittlitz.
Kamtschatka. Dem vorhergehenden ganz ähnlich bis auf die Schwungfedern, welche hier aschgrau sind mit runden, weissen Spitzenflecken.

12) *Leucopterus* Faber; *glaucoides* Temm.

Nordische Hemisphäre. Unterscheidet sich von *L. Consul* durch die kleinere Gestalt und längeren Schwingen.

13) *Glaucescens* Licht.
Amerikanische Küsten des Behringschen Meeres und Grönland. Dem vorhergehenden ganz ähnlich bis auf die Schwungfedern, die aschgrau sind mit runden weissen Spitzenflecken. Das Jugendkleid ist, wie bei *L. glaucopterus*, dunkelgrau. Bei Holböll als blosse Farbenverschiedenheit von *L. leucopterus* aufgeführt.

Journal für Ornithologie, 1855, p. 281, 282.

VI. *Laroides* Brehm (statt *Glaucus*). Silbermöve.

18) *Glaucus* Brünn., *consul* Boie.
Nord Europa und Grönland.

19) *Glaucescens* Licht., *glaucopterus* Kittl.
Kamtschatka. Dem vorhergehenden ganz ähnlich bis auf die Schwungfedern, welche hier aschgrau sind mit runden weissen Spitzenflecken.

20) *Leucopterus* Fab., *glaucoides* Temm. [p. 282].
Nordische Hemisphäre. Dem *L. glaucus* sehr ähnlich, jedoch durch seine kleinere Gestalt und die langen Schwingen leicht zu unterscheiden.

21) *Chalcopterus* Licht.
Amerikanische Küsten des Behringschen Meeres und Grönland. Dem vorhergehenden ganz ähnlich bis auf die Schwungfedern, die aschgrau sind, mit runden, weissen Spitzenflecken. Das Jugendkleid ist, wie bei *L. glaucopterus*, dunkelgrau.

Notwithstanding Saunders's identification of the types, the names *chalcopterus* and *glaucescens* Bruch, 1853, are left out of the synonymy above, as there is a bare possibility that they may rather belong to *L. kumlieni*, or to *L. nelsoni*, or both (??)

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond tail.	Chord of culmen.	Bill from nostrils.	Height of bill at nostrils.	Wing.	Tail feathers.	Tarsus.	Middle toe with claw.
			1882.		mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
89121	1080	Bering Island.	May 25	♂ ad.	626	20	.....	.....	.....	...	.....	.....	.....
89122	1142	.....do.....	June 1	♂	670	.....	60	29	22	452	782	75	72
89123	1208	.....do.....	June 12	♂ ad.	.....	.....	54	24	20	415	162	70	66
92826	1741	.....do.....	Nov. 21	♀ ad.	603	5	51	24	20	415	178	68	67
			1883.										
92827	2219	Copper Island.	July 2	pull.	.....	.....	20	.....	.....	.....	24	.....	.....

No. 89121.—Iris light yellowish gray. Bill intense lemon-yellow; tips of both mandibles whitish; a vermilion red spot on each side of the angle of the gonys; corner of mouth flesh-color. Naked eye-ring reddish flesh-color. Feet flesh-colored; tarsus faintly tinged with brownish; nails black.

No. 89122.—Iris dirty white with a creamy tinge. Bill yellow with red spot. Feet flesh color; tarsus faintly shaded with bluish.

No. 92826.—Iris faint yellowish white with blackish mottlings. Bill yellowish white, pure straw yellow on culmen in front of nostrils and along tomia; a reddish orange spot with dusky shadings on lower mandible; corner of mouth flesh-color, as is also the naked eye-ring. Feet reddish flesh-color, lighter below; webs more reddish; nails bluish black.

No. 92827.—Iris dark brown. Bill black; tip, abruptly, light brownish flesh-color; angle of mouth dull reddish flesh-color; naked eye-ring dark brownish gray. Feet dark brownish gray.

As in the other members of the genus *Larus*, there is an increase of the white on the primaries with the age of the individual. Thus, in No. 89122 (which is a rather young bird, with the tail still uniform gray, but which has already assumed the bluish mantle), the first primaries are uniform gray with a brownish tinge, and without any distinct pattern.

No. 89121 is somewhat older, having the tail wholly white, except the middle pair of rectrices, which is mottled with gray. In this specimen the primaries are very much worn, but the pattern as it was in the fresh feathers is plainly visible, agreeing closely with several other specimens in the National Museum; on the first primary is a subapical mirror, beyond which the tip is gray, with indications of the extreme tip being white in the fresh feather; the second and third primaries have only small terminal white spots. In No. 92826 on the first primary the mirror is considerably larger, having, besides, united with the white tip in the outer web, and leaving only a narrow bridge of gray separating the apical and the subapical spot of the inner web; the second primary has, in addition to the broader white apex in the outer web, a longitudinal oblong mirror, to which corresponds a larger but not

so well defined white spot on the inner web; the third primary has the white tip and the ill-defined white spot, though smaller, on the inner web, without any subapical spot on the outer web, however. These feathers are fresh, in fact, not yet fully out, and the gray parts lying between the spots are of a little more saturated gray than the rest of the quill.

No. 92827 is a downy young, only a few days old. The general color is of a very light grayish brown, whitish on the abdomen, and spotted with blackish on head and upper parts generally. It is very much like the downy young of *L. argentatus*, but has the dark spots and mottlings on the back much darker.

The Glaucuous-winged Gull (Russ. *Tschaika*) is the only gull of the genus *Larus* proper breeding on the islands. Taczanowski (Bull. Soc. Zool. France, 1882, p. 397), however, asserts that he has received birds and eggs of "*Larus borealis*" from Bering Island, a statement not more to be relied upon than that of the same author when he gives *Somateria mollissima* (!) as breeding on the same island. As he does not mention *L. glaucescens* which is so very common, the inference is justifiable that he has mistaken this species for *borealis*, and consequently I put the latter name in the synonomy with a query. It may be, however, that some mistake in the labeling has taken place.

The Tschaika is a very common bird and rather numerous, although less so in winter than during the summer. To the hunting ornithologist they are a perfect nuisance, following him with their penetrating i-a, i-a, i-a—gagagagaga, the latter sounds in rapid succession, warning all the feathered tribes of the approaching enemy.

During and after the sealing season they feed chiefly upon the carcasses of the slain seals, especially on Copper Island, where a constant fight goes on between the tschaika, the raven, and the blue fox. In the fall, when only the skeletons are left, the gulls still visit the killing-grounds, which, at that period, are swarming with the big white larvæ of the flesh-fly.

The favorite breeding places on Bering Island are not so numerous as on Copper Island, where these birds breed everywhere all around the shore. On the former island colonies are especially numerous on Toporkof and Arij Islets, at Zapadnij Mys, some inacessible rocks between the northern seal rookery and Saranna, at Tonkij Mys, Staraj Gavan, &c.

Eggs were found in 1883 on Arij Kamen as early as May 16 (U. S.

Nat. Mus. No. 21798, L. Stejneger 1173) and measure 73 by 54.5 and 73.25 by 55mm.

Compared with eggs of *Larus glaucus* those collected by me show a just perceptibly more greenish tinge and somewhat smaller, more numerous, and better defined spots.

17. Larus schistisagus STEJNEGER.

Diagnosis.—White; mantle dark bluish slate gray. First primary, with a long white tip, apical and subapical spots being fused together, and a gray "wedge" on the inner web; second, with a subapical white spot on the inner web only, and the gray wedge further down; third, with the wedge reaching the subapical spot; no gray wedge on outer web of the four first primaries. Feet pinkish flesh-color. Total length 670mm, wing 460mm.

1858.—*Larus argentatus* KITTL., Denkw., II, p. 225 (*part*).

1858.—*Larus cachinnans* KITTL., Denkw., I, p. 336 (*nec* PALL.).—SWINH., P. Z. S., 1863, p. 324.—*Id.*, *ibid.*, 1871, p. 421.—*Id.*, Ibis, 1863, p. 428.—STEJNEGER, Naturen, 1884, p. 6.

1860.—*Larus argentatus* var. *cachinnans* SCHRENCK, Reis. Amurl., I, p. 504.

1867.—? *Larus occidentalis* WHITELY, Ibis, 1867, p. 210 (*nec* AUDUB.).

1871.—? *Larus fuscescens* "Mus. St. Petersb.", MEVES, Öfv. Vet. Akad. Förhandl., 1871, p. 787.

1871.—*Larus borealis* GRAY, Handl., III, p. 113 (*nec* Bruch).

1872.—*Larus marinus* RIDGWAY, Bull. Nutt. Orn. Cl., 1882, p. 60.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 168.—NELSON, Cruise Corwin, p. 107 (1883).

1876.—*Larus pelagicus* TACZAN., Bull. Soc. Zool. France, 1876, p. 263 (*nec* BRUCH).—*Id.*, *ibid.*, 1882, p. 395.—*Id.*, Orn. Faun. Vost. Sibir., p. 64 (1877).

1884.—*Larus schistisagus* STEJNEGER, Auk, 1884, p. 231.—BAIRD, BREWER, & RIDGW., Waterb. N. Amer., II, p. 229, (1884).

In order to find out what my bird is, it may be well first to point out what it is not.

It is *not* (compare pl. vi, fig. 3, and description p. 68), *Larus cachinnans* PALL., with the eye-rings "coccineis," the feet "pallide flavis," and the back like *ichtyaetus*, "intense leucophæa seu cœrulescenti-cana." Nor is it Saunders's *cachinnans*, which apparently is the bird described by Pallas, being distinguished by its "*darker* mantle (than in *argentatus*), *yellow* legs and feet, and the *deep orange-red* ring around the outside of the eye", (P. Z. S., 1878, p. 170). Sclater's *fuscescens* (P. Z. S., 1867, p. 315), has the back "nigrescenti-cinerea," but the feet, "læte flavi." Does not this belong rather to *affinis* than to *cachinnans*? "Chlamyde nigrescenti-cinerea," would hardly do for the latter.

Furthermore, it is *not borealis* of Bruch (*Larus* (*Glaucus*) *borealis* "Brandt," J. f. Orn., 1853, p. 101), which is "considerably larger than *argentatus*, but otherwise similar to this species." Whether *borealis* Brandt, is something different from *borealis* Bruch, I do not know, but I

have not been able to find any description of Brandt earlier than Bruch's of 1853. Bruch's *borealis*, at least, seems to belong to *cachinnans* Pall. & Saunders and not to *affinis* Reinh. (cfr. Seebohm, Ibis 1884, p. 32.)

Nor is it *Larus affinis* of Seebohm and Harvie Brown (Ibis 1876, p. 452), which has "yellow legs, and the circle round the eye brilliant vermillion, or the color of a Seville orange." Identical with this is evidently Meves' *Larus cachinnans* (Öfr. Vet. Akad. Förhandl., 1871, p. 786), in which the "legs had a beautiful lemon-yellow color," and the angle of the mouth and the eyelids were "orange-red."

It is *not Larus* (*Dominicanus*) *pelagicus* Bruch (J. f. Orn., 1853, p. 100), which has the back "mostly darker" than *marinus*, and which is "one-fourth smaller than the latter."

It is now time to look for what it is.

In the first place it is v. Schrenck's (and Middendorff's) *Larus argentatus* var. *cachinnans* with dark mantle and flesh-colored feet (Reis. Amurl. I, p. 505). It is also, most probably, the *fuscescens* of the museum in St. Petersburg (fide Meves, *t. c.*, p. 787). I also feel confident that it is the *marinus* from the North Pacific, as given from Alaska by Bean & Nelson. In all probability the *borealis* Seebohm (Ibis 1884, p. 32), is the same bird. Captain Blakiston identified that very specimen, as I learn from his manuscript notes, with the so-called *marinus* from Japan and gives the measurement of the wing as 430^{mm}. Finally I conjecture Taczanowski's *pelagicus* (Bull. Soc. Zool., France, 1876, p. 263), from the Bay of Abrek, to belong to the present species.

Unfortunately only a single specimen was prepared, but several others were shot at Petropaulski in the latter part of May, and their characters were noted as agreeing completely with those of the specimen from Bering Island.

This specimen may be described as follows:

♂ *ad.* (*U. S. Nat. Mus., No.* 92785; *L. Stejneger, No.* 2007. *Bering Island, May* 5, 1883.) *Measurements.*—Total length, 668^{mm}; tip of closed wings beyond tail, 42^{mm}; middle claw reaches tip of tail, legs stretched backward. Weight, 4 lbs. Wing, 467^{mm}; tail-feathers, 191^{mm}; chord of culmen, 57^{mm}; bill along gape, 81^{mm}; bill from fore border of nostrils, 26^{mm}; height of bill at fore border of nostrils, 22^{mm}; tarsus, 71^{mm}; middle toe with claw, 71^{mm}.

Notes on color of unfeathered parts (see the colored drawing, pl. vi, fig. 3; which was made immediately after the bird was shot; it was not skinned before the next morning, when the eyelids were found to have changed into a vivid red flesh color)—Iris clear Naples yellow or rather a yellowish cream color. Bill deep gamboge yellow with whitish tips

and tomia; an orange red spot on each side of the lower mandible; angle of mouth yellowish flesh color. Naked eye-ring, reddish violet gray. Feet pinkish flesh color; nails horny black with whitish tips.

New feathers were coming out on head, neck, and back, the whole plumage being quite fresh and new.

The whole plumage, except the wings and the mantle, dazzling white.

FIG. 3.—First three primaries of *Larus cachinnans*.

The latter pure bluish slate gray without any mixture of brownish, of a shade just between the same parts in *Larus occidentalis* and *L. dominicanus*, being a little lighter than the lightest *L. marinus* I have seen, and easily distinguishable from the latter by the pureness of the gray, which has a decided inclination to bluish. The coloration and pattern of the wings are essentially similar to those of *L. marinus* and *cachinnans* and

may be described in detail as under. I may mention that for convenience I adopt Saunders's terms "mirror" and "wedge," the former signifying the white subapical spot, the latter meaning the gray color on the webs from the base upwards. It is further to be remarked that the tips are very little worn.

First primary with the tip almost wholly white, a trace of the black crossbar only visible as a small spot near the edge of both webs; shaft

FIG. 4.—First three primaries of *Larus schistisagus*.

black in the black portion and in the white also; a well-defined bluish slate-colored wedge in the inner web reaches near the tip by about twice the length of the white apex. The second primary has a small apical white spot, and the "mirror" is reduced to a rounded spot in the inner web close to the edge; the gray wedge of considerably greater

extent than on the first primary. In the third the wedge occupies still more of the inner web and reaches the posterior border of the mirror which is larger than on the foregoing and of a different shape, still without reaching the shaft or the outer web, however.* The fourth is essentially similar, and in the fifth a gray wedge occupies most of the outer web too, thus reducing the black to a subapical cross band, pre-

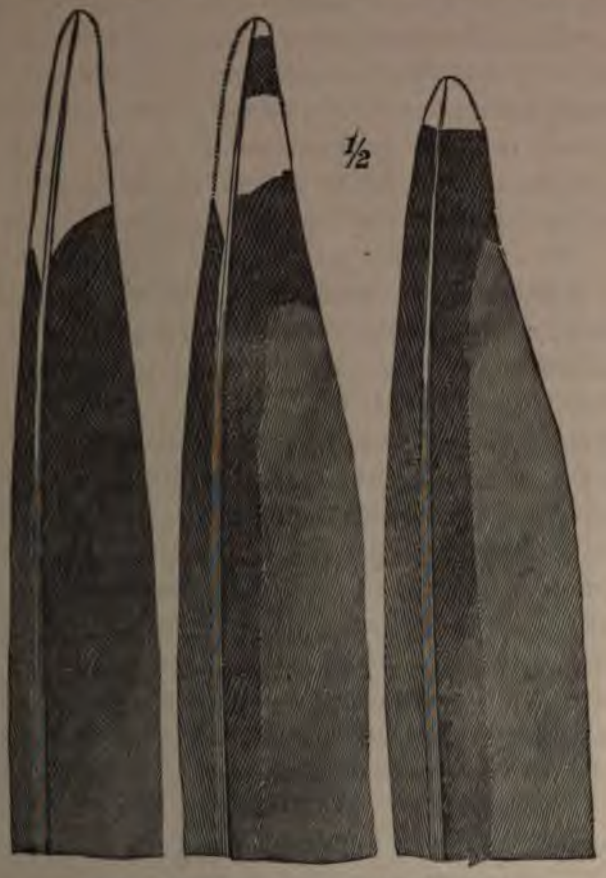


FIG. 5.—First three primaries of *Larus marinus*.

cisely as in a specimen of *L. marinus* now before me. None of the foregoing (1–4) primaries have any distinct gray on the outer web.

This species is so puzzlingly intermediate between *L. marinus* and *cachinnans* that it is difficult to say to which of these it is most closely allied, but on the whole I am inclined to look upon it as nearer to the former, with which it is placed at first sight on account of the darkness of the mantle, which in the live bird appears to be wholly black.

* Not well represented in the drawing, Fig. 4.

In size it is somewhat intermediate between *marinus* and *argentatus*. My specimen comes very close to average measurements of *marinus*, while having wings an inch longer than the male specimen from Japan, collected by Captain Blakiston (No. 1085, Hakodadi, March 1, 1878), and determined by Saunders as *marinus*, but which I suppose belongs to the present species. The bill is decidely slenderer than in either of these species, while of the same shape.

The colors of the naked parts are essentially the same, for although the angle of mouth and the eye-ring are rather pale in my specimens, these parts may possibly assume more vivid colors later in the season. The feet are more reddish than in *marinus*, being even slightly more so than in *argentatus*, and without the faintest trace of yellowish.

As already remarked, the shade of the mantel is rather dark, being only a trifle lighter than that of *marinus*, or intermediate between *occidentalis* and *dominicanus*, and exactly of the same tint as in *occidentalis*, only considerably deeper and darker. It consequently needs no comparison with *argentatus* or *cachinnans*, in this respect differing from them nearly as much as they do from *marinus*.

Characteristic of the wing pattern is the presence of a well-developed "wedge" on the inner web of the first primary as distinctive from *marinus*, as well as the absence of a similar wedge on the outer webs of the second to fourth primary, in which it differs from *cachinnans* and *argentatus*. The mirror on the second primary is also peculiar, resembling, however, the pattern of the corresponding quill in *L. cachinnans*. In the third primary the large white spot at the end of the gray wedge is very characteristic. It may thus be seen that while the second primary shows less white than in *marinus* and *argentatus*, the third has more of the same color than is the case in the latter two species and in *cachinnans*.

On the 20th of April, 1883, I observed for the first time, among numerous *L. glaucescens* on the reef at Staraja Gavan, eastern shore of Bering Island, a few gulls of about the same size, but with the tips of the wings black, and the mantle dark, almost blackish. Four days later I met a couple of birds on the western shore, near the village, and on May 2 and 5, I observed them at the same place, the latter date some twelve to twenty individuals, partly in company with *glaucescens*, partly by themselves. The same day the specimen described above was obtained. They were not seen on the island since, and were in fact, unknown to the natives, so that it is safe to say that this species only visits the Commander Island occasionally, inasmuch as a "Tschaika"

with blackish back is wholly unknown to the inhabitants of Copper Island also.

When I arrived at Petropaulski, Kamtschatka, on the 14th of May, 1883, I found the same species pretty common on the ice, covering the lake, or rather lagoon, to the north of the town, but as the ice was very dangerous, the birds were either out of range, or if shot, impossible to get at. Two were obtained, however, but being too badly damaged to be preserved, only notes of the colors were taken. The color of the feet of the living bird was also observed through a powerful binocular, and noted, being in all cases the same uniform pinkish flesh color.

From the inhabitants I learned that this bird breeds at Babuschkin Kamen, in the Bay of Avatscha, and on Staritskof Island, south of the entrance to that bay.

Two additional specimens have been received since the above was written, an adult (U. S. Nat. Mus., No. 101665) and a young changing into the adult plumage (No. 101666), both from Petropaulski. The mantle is slightly lighter than that of the type specimen, but otherwise they agree. The feet are now dark pink, and have evidently been pinkish flesh color in life, as were all the birds of the species I have seen. This character at once distinguishes *L. schistisagus* from *L. affinis*, which is said to have the feet yellow, and also from *L. marinus*, in which the flesh color is very pale and rather grayish.

In the following the first measurement is that of the adult bird (No. 101665), the second one that of the young (No. 101666); length of wing is not given, as both birds are moulting the primaries:

	Millimeters.
Tail-feathers	163–180
Chord of culmen	58– 56
Bill along gape	79– 83
From nostrils	28– 27
Height at fore border of nostrils	20– 22
Tarsus	69– 76

18. Larus kamtschatchensis (BONAP.).

1826.—*Larus niveus* PALL., Zoogr. Ross. As., II, p. 320 (*nec* BODD., 1783, qui *Gavia alba* GUNN.).—BONAP., Consp. Av., II, p. 224 (1856).—WHITELY, Ibis, 1869, p. 210.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 189 (*part*).—*Id.*, *ibid.*, X, 1882, p. 104.—TACZAN., Bull. Soc. Zool. France, 1883, p. 341.

1854.—*Gavina kamtschatschensis* BONAP., Naumannia, 1854, p. 215 (cfr. *Id.*, Consp. Av., II, p. 224, and Rev. & Mag., 1857, Extr. No. 2, p. 10).

1878.—*Larus delawarensis* SAUNDERS, P. Z. S., 1878, p. 176 (*part; nec* ORD).—SEEB., Ibis, 1879, p. 24.—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 104.—BLAKIST., Amend. List B. Jap., p. 20 (1884).

1878.—? *Larus californicus* SAUNDERS, P. Z. S., 1878, p. 175 (*part; nec* LAWR.).—SEEB., Ibis, 1879, *p. 24.*

I cannot help thinking that Pallas's *Larus niveus* really belongs here, having nothing to do with either *canus* or with *californicus*. Notwithstanding the fact that the name is preoccupied, the question of the identity af Pallas's bird is of real importance.

In the first place I concur unconditionally with Mr. Saunders (P. Z. S., 1878, p. 175) in the view that Pallas's *niveus* is something entirely different from *canus*, his remarks so far being quite conclusive. I also feel convinced that Mr. Saunders was right in referring the Japanese specimen to Pallas's bird, but I do not believe that either of them are correctly placed with *L. californicus* LAWR.

Both on Bering Island and Kamtschatka I collected a sea gull which corresponds so closely with Pallas's *niveus* as to leave no doubt in my mind that here at last is the bird to which belongs that most unfortunate name. A careful comparison of my specimens with numerous examples of *canus*, *brachyrhynchus*, *californicus* and *delawarensis* proves conclusively that they are more closely related to the last-named species than to any of the foregoing; but although evidently the Asiatic representative of *delawarensis* it is sufficiently distinct to deserve recognition by name. The future will have to decide, if it should be a trinominal. Let us hope, then, that no intergradation can be proven as *Larus delawarensis kamtschatchensis* would be an awkward appellation indeed.

This Asiatic form is in some respects intermediate between *delawarensis* and *californicus*, thus explaining how Saunders came to identify it with the latter. The color of the mantle is absolutely identical in tint and shade with that of *californicus*, consequently being considerably darker than in *delawarensis*, representing in fact a similar difference as that between *cachinnans* and *argentatus*. On the other hand, the coloration of the wing is much more like that of *delawarensis* than *californicus*, the black occupying a much larger area compared with the gray than in the latter. As to size and shape the bill differs in no way from that of *delawarensis*, but in coloration it disagrees with both the American species, the dusky ring before the tip being rather faintly indicated and fading almost completely out in the dried specimen, while in the two other species mentioned it keeps distinct for years and years.

A young bird (No. 92888, Bering Island) in transitional plumage, just assuming the bluish mantle, is in almost every respect an exact counterpart of a young *delawarensis* from Tehuantepec, Mexico, in the same state of plumage. But even in these the difference in shade of the gray

of the mantle is very perceptible, while the Mexican bird has a distinct ring on the bill, hardly appreciable in the specimen from Bering Island.

According to the above, the present form may be characterized as similar to *L. delawarensis*, but with the mantle of *californicus*.

Of course, the reference of Saunders's *californicus* from Japan to the species in question is merely hypothetical, as there is as much possibility for a Californian species occasionally straggling to Japan as for a European appearing in the same manner in America. Much less doubt is felt as to the other Japanese specimen, a young bird which Saunders determined as *delawarensis*.

Pallas's name *niveus* being preoccupied we will have to look out for another name. It may possibly be Middendorff's *L. canus* var. *major* (1853), but as I have serious doubts as to the pertinency of that name, and Saunders refers it to *canus*, and not to the Eastern Asiatic form, considered by him to be *niveus* = *californicus*, the varietal name given by the great Siberian traveler may rest in peace where Saunders has left it.

In 1854 Bonaparte, speaks of a new species in the following terms: (Naumannia, 1854, p. 215) "*Gavina kamtschatchensis*, Bp., qui est la race kamtschadale du *Larus canus* L." As this is all he says about it the name is a "*nomen nudum*," and consequently not entitled to recognition. But two years later we find in Bonaparte's Conspectus Avium (II, p. 221), as also in an article in the "Revue et Magazin de Zoologie" for 1857, a statement that the name is a synonym, partially so at least of *L. niveus* PALL., and as the description and the habitat assigned fit our bird we feel no hesitation in adopting it.

List of specimens obtained.

Museum No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wing.	Tail-feathers.	Chord of culmen.	Bill from nostrils.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
[illegible]	2052	Petropaulski, K...	1883. May 21	♂ ad.	512	69	378	153	44	21	59	50
[illegible]30	2728	... do	Oct. 18	♂ ad.	.....	.....	350[1]	144	41	21	57	49
[illegible]80	2068	Bering Island.....	May 29	(♂)jun.	(482)	.....	370	137[2]	42	20	59	50
[illegible]67	.....	Petropaulski, K ..	1884.	ad.	.....	.....	(1)	149	39	21	56	.....

[1] Moulting. [2] Very worn.

[illegible] 92889.—Iris grayish cream color. Bill ocher-yellow tinged with olive, and with a dusky spot on [illegible] mandibles towards the tip. Naked eye-ring vermillion. Feet pale lemon-yellow with a bluish [illegible]n tinge which is stronger on the joints. Testes large, swollen. Pl. vi, fig. 4.

[illegible]. 92890.—Bill pale straw-yellow, greenish gray towards the base; angle of mouth orange. Eye-ring [illegible] reddish. *Feet pale straw-yellow; webs more vivid.*

The present species seems not to be common on the coast of Kamtschatka, where it probably breeds, however. The specimens procured by me were obtained in the harbor of Petropaulski in May and October, when only a few were seen at the time.

Another specimen was shot on Bering Island during my absence in Kamtschatka and preserved. It was probably only a straggler, as the species does not breed on the island.

Since the above was written, Capt. E. J. Hunter had the kindness to send me another specimen shot, in the fall of 1884, at Petropaulski. It closely resembles No. 92890, but the mantle is a shade deeper. The measurements are embodied in the table above.

19. Larus canus LIN.

1758.—*Larus canus* LIN., Syst. Nat., 10 ed., I, p. 136.—MIDDEND., Sibir. Reise, II, 2 (p. 243) (1853).—SCHRENCK, Reis. Amurl., I., p. 509 (1860) (*part?*).—SWINHOE, P. Z. S., 1871, p. 420.—SAUNDERS, P. Z. S., 1878, p. 177.—BLAKIST., & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 189 (*part?*).—*Id. ibid.*, X, 1882, p. 104.—BLAKIST., Amend. List. B. Jap., p. 20.

A single specimen, evidently a straggler, was collected by me on Bering Island during the early part of the winter 1882. It is in every respect, color, and size a typical *canus*, being absolutely identical with a specimen from Denmark in the collection of the National Museum. In fact, I have seldom seen two members of the Larine family so alike as these two from the most extreme regions of the Palæarctic continent. The Danish bird is a trifle larger, but it may have been a male, as the sex is not given on the label.

The measurements of my specimen are as follows:

♀ *ad. U. S. Nat. Mus. No.* 92894; *L. Stejneger, No.* 1747. *Bering Island, November* 26, 1882.

Total length, 472mm; wings beyond tip of tail, 30mm; wing, 337mm; tail-feathers, 139mm (fresh, unabraded); chord of culmen, 35mm; bill from nostrils, 18mm; tarsus, 53mm.

Iris cream color, with dark gray shadings. Bill, olive yellow, tip purer yellow; angle of mouth, orange red. Naked eye-ring, dusky red. Feet, grayish olive yellow; joints darker, somewhat bluish; webs purer yellow.

The gullet was crammed with fish spawn, several *Orchestiæ* and other *Gammaridæ*, plenty of a small, blackish-brown chrysalis of a dipterous insect common on sandy beaches, and a small fish.

20. Larus ridibundus LIN.

1766.—*Larus ridibundus* LIN., Syst. Nat., 12 ed., I, p. 225.—NORDM., in Erman's Verz. Thier. Pflanz. Reis. Erde, p. 18 (1835).—MIDDEND., Sibir. Reis., II, 2 (p. 244) (1853).—KITTL., Denkw., II., p. 200 (1858).—SCHRENCK, Reis. Amurl., I., p. 510 (1860).—RADDE, Reis. Süd. Ost-Sibir., II, (p. 387) (1863).—SAUNDERS, P. Z. S., 1878, p. 200.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 190.—*Id., ibid.*, X, 1882, p. 105.—BLAKIST., Amend. List B. Jap., p. 10 (1884).—*Chroicocephalus r.* SWINH., Ibis, 1863, p. 428.—*Id., ibid.* 1874, p. 165.—*Id.*, P. Z. S., 1871, p. 421.—BLAKIST. & PRYER, Ibis, 1878, p. 217.—SEEB., Ibis, 1879, p. 24.

1776.—*Larus atricilla* PALL., Spicil Zool., V, p. 28 (*nec* LIN.).—*Id.*, Zoogr. Ross. As., II, p. 324 (1826).—FALCK, Reise, III (p. 354) (1786).

1820.—*Larus capistratus* TEMM., Man. d'Orn., 2 ed., II, p. 785.—*Chroicocephalus c.* SWHINH., P. Z. S., 1863, p. 326.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 338.—TACZAN., J. f. Orn., 1873, p. 111.—*Id.*, *ibid.*, 1874, p. 337.—*Id.*, *ibid.*, 1875, p. 257.—*Id.*, *ibid.*, 1876, p. 202.—*Id.*, Bull. Soc. Zool. France, 1876, p. 264.—*Id.*, *ibid.*, 1882, p. 397.—*Id.*, Orn. Faun. Vost. Sibir., p. 65 (1877).

1857.—*Larus brunneicephalus?* CASSIN, Exp. Jap. Perry, II, p. 233.

Having no true *L. ridibundus* from Europe at hand I shall make no attempt, at present, at separating the eastern bird from the western. I will only point to the fact that even the smallest dimensions of my birds and of a series of specimens from Japan (together with numerous measurements in Blakiston's manuscript notes from the latter country) are considerably larger than the maximum of a series of some thirty specimens as given by Schlegel (Mus. P. B. Lari, p. 38). It was this large size which induced Cassin to regard the specimen from Japan (and I have re-examined and re-measured it and find it agree perfectly with others from the same locality and from Kamtschatka) as belonging to *brunneicephalus* JERDON. Middendorff's *L. ridibundus* var. *major* is probably the same thing. The pattern of the first three primaries is essentially the same as that given by Saunders (P. Z. S., 1878, p. 201, fig. 12), only that on the third primary at least the outer half of the light portion is a distinct and rather well-defined bluish gray of the same color as the back.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92892	2595	Petropaulski	Sept. 18, 1883	♀ ad.	415	40	317	130	37	47	42
92893	2719	....do.....	Sept. 28, 1883	♀ ad.	.....	.....	*284	116	34	45	.....
92891	2741	....do.....	Oct. 1, 1883	♀ ad.	.....	.....	†308	128	34	44	.....

*Moulting. †To tip of second primary; the first one still growing and shorter than the second.

No. 92892.—Iris dark brown. Bill pale salmon red; tip in front of nostrils dark brownish. Feet and webs similarly colored; tarsus in front brownish gray, and toes a little more livid than the webs; nails, blackish.

No. 92893.—Bill and feet vermilion, the former somewhat dusky towards the tip.

This species occurs abundantly in the vicinity of Petropaulski, where it breeds. It was not seen on the islands during my stay there, but I was informed that a few have been observed occasionally at Lake Saranna.

21. Rissa tridactyla pollicaris STEJNEGER.

1769.—*Larus ryssa* PALL., Spicil. Zool., V, p. 28.
1826.—*Larus rissa* PALL., Zoogr. Ross. As., II, p. 321 (*nec* BRÜNN 1764.)
1832.—*Larus tridactylus* KITTL., Isis, 1832, p. 1104.—*Id.*, Denkw., I, pp. 248, 287; II, p. 225 (1858).—COINDE, Rev. Mag. Zool., 1860, p. 401.—BLAKIST. & PRYER, Ibis, 1878, p. 217.—SEEB., Ibis, 1879, p. 24.—*Id.*, *ibid.*, 1884, p. 32.—BLAKIST., Amend. List B. Jap., p. 34 (1884).—*Rissa t.* DALL & BANNIST., Tr. Chicag. Acad. I, 1869, p. 305.—FINSCH, Abh. Brem. Ver. III, 1872, p. 84.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 8 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 9 (1874).—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 190.—*Iid.*, *ibid.*, X, 1882, p. 105.—TACZAN., Bull. Soc. Zool. France, 1883, p. 398.
1853.—*Larus* (*Rissa*) *brachyrhynchus* BRUCH, Journ. f. Orn., 1853, p. 103, sp. 31, (*nec* GOULD, 1843, *nec* RICHARDS., 1831).—*Rissa brachyrhyncha* TACZAN., Bull. Soc. Zool. France, 1876, p. 264.—*Id.*, Orn., Faun. Vost. Sibir., p. 65 (1877).
1854.—*Rissa nivea* BONAP., Naumannia, 1854, p. 212 (*nec* PALLAS, 1826, *nec* Gray, 1845).—*Larus* (*Rissa*) *niveus* BRUCH, Journ. f. Orn., 1855, p. 285, sp. 36.
1856.—*Rissa kotzebui* BONAP., Consp., Av., II, p. 226 (*nec* 1854 quæ *brevirostris* BRANDT).—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 60.
1872.—*Larus tridactylus* var *kotzebui* COUES, Key, p. 314.—*Id.*, in Elliott's Aff. Alaska, p. 199 (1875).
1880.—*Rissa tridactyla kotzbuei* RIDGW., Pr. U. S. Nat. Mus., 1880, p. 206.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 167.—NELSON, Cruise Corwin, p. 105 (1883).
1884.—*Rissa tridactyla pollicaris* STEJNEGER, in B. Br. Ridgw., Water B., II, p. 202.—TURNER, Auk, 1885, p. 158.

In the Journal für Ornithologie for 1853 (p. 103) Mr. Bruch enumerated monographically the species of the subgenus *Rissa* as follows:

30. *tridactylus* Lin. Northern coasts of the whole earth.
31. *brachyrhynchus* Gould. North America. The hind toe, however, is somewhat better developed than in the foregoing species.
32. *brevirostris* Brandt. Northwestern coast of America. The feet are bright coral-red, and the bill is yellow.

In the "Naumannia" for the following year (1854) Bonaparte reviewed Bruch's paper, and in offering his list, with the "erreurs et omissions que j'ai pu y reconnaître," he treats the *Rissæ* (p. 212) as follows:

40. tridactyla L., ex Hemisph. bor.
41. nivea Pall., ex borealib. As. or. Am. occ.
42. Kotzebuii Bp., ex Am. s. occ. Californ.

It will be seen that the differences from Bruch's enumeration are:

(1) The change of the name "*brachyrhynchus* Gould" into "*nivea* Pall."

(2) The change of the name "*brevirostris* Brandt" into "*kotzebuii* Bp." This is the first occurrence of the latter name!

(3) The habitat of the second and third species is given with more detail than in Bruch's list. When Bruch, in 1855, (Journ. f. Ornith, p. 285), presented his "Revision der Gattung Larus Lin.," he evidently

only revised his former list, availing himself of additional material and critical notes of his friends, especially of Bonaparte's.

This is also evident from an inspection of the subgenus *Rissa*, which in the "Revision" has the following aspect:

35. *tridactylus* Lin. The high North.
36. *niveus* Pall., *brachyrhynchus* Gould. Northwest coast of America. The hind toe better developed.
37. *brevirostris* Brandt. Northwest coast of America. Also with better developed hind toe; bill, yellow; feet, coral-red.

The only changes are evidently caused by Bonaparte's criticism, and amount to—

(1) The adoption of Bonaparte's "*niveus* Pall.," and the reduction of "*brachyrhynchus* Gould" Bruch (No. 31 of the first list) to a synonym of the latter; and

(2) The designation of Northwest America as the habitat of this species.

But he does not deem it necessary to provide "*brevirostris* Brandt," with the new name *kotzebuii*.

We are now justified in concluding (*a*) that No. 30, Bruch, 1853; No. 40, Bonaparte, 1854, and No. 35, Bruch, 1855, are unquestionable synonyms; (*b*) that the same is the case with No. 31, Bruch, 1853; No. 41, Bonaparte, 1854, and No. 36, Bruch, 1855; and with (*c*) No. 32, Bruch, 1853; No. 42, Bonaparte, 1854, and No. 37, Bruch, 1855.

We are, in my opinion, further justified in concluding (*d*) that Bruch's "*brachyrhynchus* Gould," and Bonaparte's "*niveus* Pall." is the Pacific representative of the Atlantic *tridactyla* with a somewhat better developed hind toe.

It will be seen that "*brevirostris* Brandt" Bruch, with yellow bill and coral-red feet is the one upon which Bonaparte originally bestowed the name *kotzebuii*. That this view is absolutely correct is proved by Bonaparte's own words on p. 217 of the same article (Naum. 1854*), where he says: " * * * ne vaudrait-il pas mieux appeler *Kotzebui* * * * la bonne espèce des côtes Nord-ouest de l'Amérique à laquelle on applique le nom plus que douteux de *brevirostris*, Brandt;" that is: "Would it not be better to give the name *kotzebui* to that good species from the northwest coast of America, to which has been applied the more than doubtful name *brevirostris* Brandt." That Bonaparte by "on" means Bruch cannot be doubted.

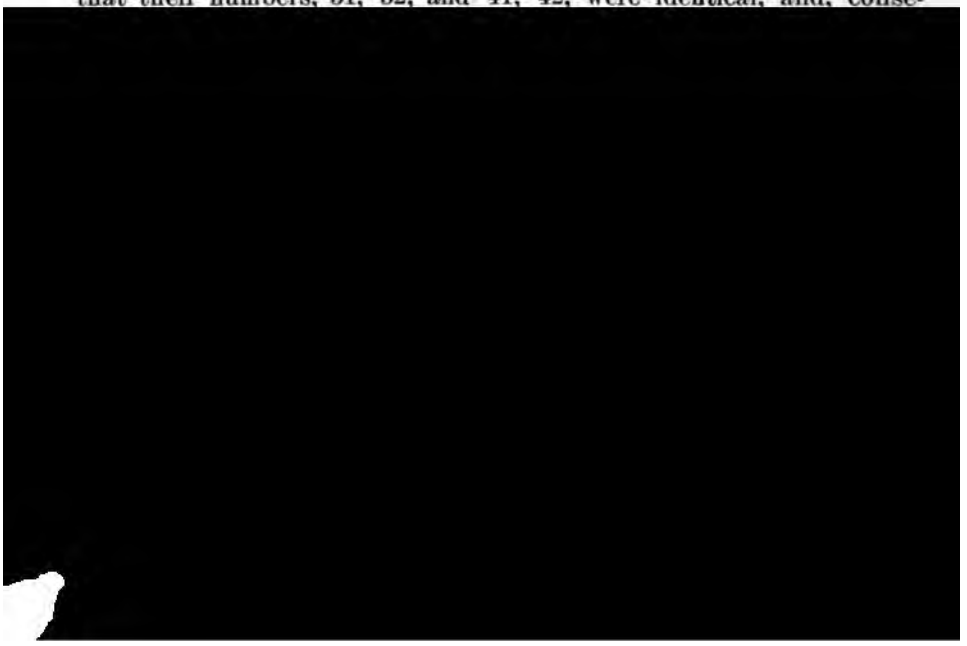
* Reprinted in his paper entitled "Notes sur les Larides," in Rev. et Mag. de Zool., 1854, p. 10.

It was only two years after that Bonaparte (Consp. Avium, II, p. 226) transferred the name *kotzebui* to the black-legged representative of *tridactyla* in the Pacific.

The above conclusions were made under the supposition that "No. 31, *brachyrhynchus* Gould," of Bruch, 1853, is not the true *brachyrhynchus* of Gould (which is the red-legged *brevirostris* Brandt, with the red color of the legs faded into yellow), but the black-legged Pacific representation of *R. tridactyla*.

Somebody might, however, advocate that Bruch's *brachyrhynchus* ought to be considered the same as Gould's species, as nothing in the short diagnosis really contradicts such an opinion. It might be said, with all probability of being correct, that Bruch was under the same impression as was Dr. Otto Finsch still in 1872,* viz., that *R. tridactyla* proper is an inhabitant of the whole northern hemisphere, and that in the Northern Pacific two other *Rissæ* occur, besides, one with yellow legs (*brachyrhynchus* GOULD), another with red legs (*brevirostris* BRANDT). This being the case, Bonaparte's "41 nivea Pall." would also become a synonym of the true *brachyrhynchus* Gould. In defense of this opinion might be quoted Bonaparte's Conspectus Avium, in which he indeed gives his No. 41 as a synonym of *brachyrhynchus* =*brevirostris*, then for the first time properly located and understood.

This theory, if correct, would make no change in the results, above arrived at, as it would only prove that both Bruch and Bonaparte were wholly unacquainted with the North Pacific Kittiwake up to 1856, that their numbers, 31, 32, and 41, 42, were identical, and, conse-



List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Culmen.	Tarsus.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
92895	2080	Bering Island	May 25, 1883	(♂) ad.	(445)	325	134	39	36
89124	1200	..... do	June 13, 1882	♀ ad.	450	298	139	39	36
92896	2838	Staritskoff Island, Kamtschatka	Sept. 23, 1883	juv.	.....	318	128	32	33
92897	2837	.....do	Sept. 23, 1883	juv.	.....	.....	.....	.....	.....

No. 89124.—Iris dark brown. Bill clear yellow, in front of nostrils tinged with apple-green; tip whitish; angle of mouth and the interior of the gape deep orange-red; eye-ring vermilion. Feet blackish brown, on the outside darker, brownish black; naked part of tibia on the inner side bright orange-yellow, as are also one or two irregular spots on the inner corner of the web between middle and inner toe.

The Pacific Kittiwake, called by the natives "*Gavaruschka*," on account of its loquacity, is a common breeding bird, both on the islands and along the Kamtschatkan coast, but as all places do not suit these noisy birds or supply all their requirements the rookeries are comparatively few, a compensation for which is found in the astonishing number of individuals inhabiting each rookery. For such are chosen steep walls, rising perpendicularly out of the deep sea, and especially high pinnacles standing lonely amidst the foaming breakers, provided they are fitted out with shelves and projections upon which to place the nests.

As Copper Island offers such localities all around its shore, the Kittiwake is pretty well distributed all over that island. On Bering Island, on the other hand, only the southern part has suitable rookeries, but here the red-legged Gavaruschka excludes it from Cape Manatee to Peregrobnij. The first rookery of any importance on the western shore is among the cliffs of Dikij Mys.

The only rookery I had the opportunity of visiting on the coast of Kamtschatka is situated on a pinnacle-shaped rock, called the sentinel (Tschasovoj), close to the island *south* of the entrance to Avatscha Bay, called Staritskoff Island. It is the same visited by v. Kittlitz, more than half a century ago, and as I have nothing to add to his interesting account (Denkw., II, p. 214, seqv.), I shall only remark that I found the Kittiwake as numerous at the present time as it was on the day when he lost his gun on the "Tschasovoj."

To Bering Island they arrived in 1883, about the 1st of April, whe flocks were observed at Tolstoj Mys. I found the first young on hatched on Copper Island, August 2, 1883.

22. Rissa brevirostris (BRUCH).

1843.—*Larus brachyrhynchus* GOULD, P. Z. S., 1843, p. 106 (*nec* RICHARDS., 1831); *I* Zool. Voy. Sulphur, p. 50, pl. 34 (1844).—FINSCH, Abh. Brem. Ver., III, 187 p. 84.

1845.—*Rissa nivea* GRAY, Gen. Birds, III, p. 655 (*nec* Pall.).

1853.—*L[arus] brevirostris** BRUCH, Journ. f. Ornith., 1853, p. 103, sp. 32.—COUES, in E liott's Aff. Alaska, p. 199 (1875).—ELLIOTT, Monogr. Seal Isl., p. 133 (1882). *Rissa brevirostris* LAWRENCE, in Baird's Birds of N. Amer., p. 855.—DALL, BANNIST., Tr. Chicag. Acad., I, 1869, p. 305.—FINSCH, Abh. Brem., Ver., II 1872, p. 85.—DALL., Avif. Aleut. Isl. Unal. east, p. 8 (1873).—NELSON, Crui Corwin, p. 105 (1883).—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 60.—*I* Auk, 1884, p. 358.—TURNER, Auk, 1885, p. 158.

1854.—*Rissa kotzebuii Bonap.*, Naumannia, 1854, p. 212, (*nec* 1856).

1860.—*Larus warneki* COINDE, Rev. Mag. Zool., 1860, p. 401.

My specimen is absolutely identical with those from the Prybilo group.

The Red-legged Kittiwake—Krasno-nogaja Gavaruschka—is in ever respect, both structurally and in its habits, a true *Rissa*. Like i black-legged cousin, it only selects steep and inaccessible rocks, and i none of its habits at the breeding-place could I detect any marked di ference. They also arrive at the islands about the same time, hatchin their young simultaneously with the other species. Those birds whic are not engaged in breeding do not seem to straggle about to such a extent, however, as do the black-legged ones, and in fact I never sa a red-legged Kittiwake at any season on the northern part of Berin Island.

The two species usually keep apart from each other. In the gre rookery at Dikij Mys only one solitary red-legged bird was seen amon the thousands and thousands of black-feet, while a still greater colony Gavaruschkaja Buchta consisted of red-legs exclusively. "*R. kotzeb* [= *R. pollicaris*] was observed in countless numbers along the weste shore; but as soon as we had doubled Cape Manatee we met as lar

* One will almost invariably find quoted "*Rissa brevirostris* BRUCH." He, howev regarded the names "*Rissa*," "*Gabianus*," "*Dominicanus*," "*Glaucus*," &c., as su generic terms (he calls the groups "Familie," not genus), not to be included in t name. In his two monographs nowhere will be found the specific name connect with the subgeneric, but invariably by an "*L.*" as an abbreviation for *Larus*. S *L. leucopterus*, *L. glacialis*, *L. consul*, *L. glaucopterus*, under *Glaucus*; *L. Hartlau* under *Gavia*; *L. tridactylus* under *Rissa*, &c. His own direct remarks (J. f. Orn., 18 p. 274) are to the same effect and are absolutely conclusive.

or still larger flocks of *R. brevirostris*, among which not a single black-legged individual could be detected. * * * And thus the red-legged form completely excluded the other along the eastern shore." (Pr. U. S. Nat. Mus., 1883, p. 60.)

On Copper Island, however, I found the two species breeding together on the same rocky wall—the black-feet always higher up than the present species. The two kinds were easily distinguished when sitting on the nests, *brevirostris* having the gray of the mantle of a perceptibly darker shade than *pollicaris*.

Only one specimen was brought home. Quite a series, however, was procured at Tolstoj Mys, Bering Island, on the 27th of August, but the terrible storm of wind and rain which we encountered in the afternoon, and which lasted for three days, spoiled the specimens and made preparation impossible. We had enough to do in taking care of the boat, the tent, guns, and collections already prepared.

The measurements of this specimen are as follows:

Ad., U. S. Nat. Mus. No. 89125; *L. Stejneger No.* 1488. *Dikij Mys, Bering Island, August* 23, 1882.

Total length, 402^{mm}; wing, 324^{mm}; tail-feathers, 132^{mm}; culmen, 29^{mm}; tarsus, 33^{mm}.

Iris dark brown. Bill lemon yellow, greenish towards tip; angle of mouth and interior of gape orange-red. Naked eye-ring and feet vermilion red.

It may be well to state here that the color of the feet in the fresh bird during the summer is pure vermilion, and not orange-red, as often given (as by Mr. H. Saunders, P. Z. S., 1878, p. 165). In the dried skin the red color soon changes to orange-red, and later to a yellowish-drab, as in the figure of Gould's *brachyrhynchus* (*l. c.*). There are not two species, one with yellow legs and another with red ones, as supposed by Dr. Finsch (*l. c.*).

23. Sterna camtschatica PALL.

1826.—*Sterna camtschatica* PALL., Zoogr. Rosso-Asiat., II, p. 335 (*nec* FINSCH, Abh. Naturw. Ver. Bremen, III, p. 85 (1872) quæ. *S. aleutica* BAIRD).—KITTL., Denkw., I, p. 322, and II, p. 200 (1858).—TACZANOWSKI, Bull. Soc. Zool. France, 1876, p. 362.—*Id.*, Orn. Faun. Vost. Sibir., p. 63 (1877).—STEJNEGER, Naturen, 1884, p. 8.

1835.—*Sterna longipennis* NORDM. in Ermann's, Verz. Thier. Pflanz., p. 17 (*nec* FINSCH, J. f. Orn., 1867, p. 339, quæ *S. frontalis* GRAY; *nec* COUES, Key, p. 321 (1872), quæ *S. paradisæa* BRÜNN.).—MIDDEND., Sibir. Reise, II, 2 (p. 246, tab. 25, fig. 4), (1853).—SCHRENCK, Reise Amur-Lande, I, p. 512 (1860).—RADDE, Reis. Süden Ost-Sibir., II (p. 389), (1863).—SWINHOE, P. Z. S., 1863, p. 329.—SCHLEGEL, Mus. Pays-Bas, Sternae, p. 23 (1864).—BLASIUS, J. f. Orn., 1866, p. 80.—E. v. HOMEY., J. f. Orn., 1870, p. 439.—PRZEWALSKI, Putesch. Ussur. Supp. (n. 223), (1870).—HARTLAUB & FINSCH, J. f. Orn., 1872, p. 112.—TACZAN., J. f. Orn., 1873, p. 111.—*Id.*, *ibid.*, 1874, p. 337.—Id., ibid.,

1875, p. 257.—*Id.*, *ibid.*, 1876, p. 202.—*Id.*, Bull. Soc. Zool. France, 1876, p. 261.—*Id.*, *ibid.*, 1882, p. 397.—*Id.*, Orn. Faun. Vost. Sibir., p. 62 (1877).—SAUNDERS, P. Z. S., 1876, p. 650.—SEEBOHM, Ibis, 1879, p. 23.—*Id.*, *ibid.*, 1880, p. 194.—FINSCH, P. Z. S., 1879, p. 15.—*Id.*, Ibis, 1881, p. 540.—BLAKIST. & PRYER, Tr. Asiat. Soc. Japan, VIII, 1880, p. 188.—*Id.*, *ibid.*, X, 1882. p. 103.—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 70 (*part*), Ibis, 1883, p. 582.—*Id.*, Naturen, 1884, p. 8.—BLAKIST., Amend. List B. Jap., p. 10 (1884), 1858.—*Sterna glacialis* KITTLITZ, Denkw. Reise, I, p. 322.

Dr. Otto Finsch has most erroneously identified Baird's *aleutica* with Pallas's *camtschatica*, thus extending the range of the former species so as to embrace both the American and the Asiatic shores of the North Pacific, while it really is of a very limited distribution on the American side only. Finsch's identification was evidently made from the descriptions only, he having never seen a specimen of the true *aleutica;* but an actual comparison of my Kamtschatkan birds with a large number of *Sterna aleutica* proves, beyond doubt, that the two species are perfectly distinct, not only in color but also in proportions. In fact, Hartlaub and Finsch were perfectly correct (Orn. Centr. Polynes., p. 220) when referring Pallas's *camtschatica* to *longipennis*.

The difference in coloration between the latter and *S. aleutica* is chiefly the uniform black forehead, crown, and nape, while *aleutica* in full breeding summer plumage has the forehead and a superciliary stripe pure white. The size is about the same, but the proportions of bill and feet are rather different. In *aleutica* the bill on the average is shorter, the tarsus also shorter, but the middle toe very considerably longer. This character is very conspicuous, and will serve to distinguish the two species in all plumages.

That Nordmann's *longipennis* is the same as Pallas's *camtschatica* can hardly be doubted. When considering the description given by the latter we must remember that he had not seen the bird himself, Steller's manuscript notes being his only source, and that the measurements are evidently wrong, probably belonging to some other bird. The dimensions "*caudæ* 3′′′" and "*digiti medii* 1″ 7′′′" are, of course, not more correct than "5′′′" are correct for the tail of *Sterna caspia*, as given on a previous page. "*Rostrum nigrum*," "*Color fere St. Hirundinis*" and "*Pedes fusco-rubri*" fit the Kamtschatkan "Martischka," as it is still called by the natives (cfr. "Larus Martyschka, Steller MS."), so well as to allow no doubt as to what bird is meant.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wings.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92898	2055	Avatscha, Kam.....	May 24, 1883	♀ ad.	350	22	274	149	33	22	23
92900	2073	Bering Island.....	May 27, 1883	(♀) ad.	(370)	.....	254	161	31	21	23
92899	2102	....do.....	June 21, 1883	♀ ad.	348	29	279	146	36	22	23
101670	.....	Petropaulski, Kam ..	1884	jun.	.....	.....	260	113	30	21	22
101671	.....	... do.....	1884	jun.	.....	.....	255	115	28	20	.....

No. 92898.—Iris very dark brown. Bill black. Feet blackish red. Diameter of largest egg in ovary 5mm. Very fat.

No. 92899.—Iris dark brown. Bill black, with a reddish tinge shining through in front of the nostrils, on the gonys at base of upper mandible, and at the angle of the mouth; the extreme tip whitish. Feet dark reddish brown. Eggs in the ovary, swollen, but small. Lean.

As already stated in my preliminary report, the Kamtschatkan Tern occurs on Bering Island, but I was wrong in giving it as breeding there. The four pairs of terns stated to have bred there I found out the next year to belong to the following species (*S. paradisæa* BRÜNN).

In Kamtschatka I met this species in the middle of May, 1883, at the mouths of the rivers falling into the Bay of Avatscha, but they were not very numerous. During my visit in the autumn I saw but once a large flock, about the first of October, in the Rakovaja Guba, Avatscha Bay.

Since the above was written Capt. E. I. Hunter had the kindness to send me two birds of the year, collected at Petropaulski. The structural differences pointed out above will serve equally well for distinguishing the young. The measurements are embodied in the table above.

24. Sterna paradisæa BRÜNN.

64.—*Sterna paradisæa* BRÜNN., Orn. Bor., p. 46 (*nec* KEYS. & BLAS., 1840 quæ *douglalli*).—TURNER, Auk, 1885, p. 158.

9.—*Sterna macrura* NAUMANN, Isis 1819 (p. 1847).—DALL & BANNIST., Tr. Chic. Acad. I. 1869, p. 306.—DALL, Avif. Aleut. Isl. Unalasch. eastw., p. 10 (1873).—*Id.*, Avif. Aleut. Isl. west Unalasch., p. 9 (1874).—NELSON, Cruise Corwin, p. 109 (1883).

).—*Sterna arctica* TEMM., Man. d' Orn., 2 ed., I., p. 742.—PALMÉN, Spec. Cat. Swed. Lond. Fish. Exhib., 1883, p. 202.

.—*Sterna longipennis* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 70 (*part. nec* NORDM.).

he Arctic Tern occurs and breeds in small number on Bering Island. 1882 only four pairs were observed. They breed at the great lake a miles to the east of the village.

There are but few authentic records of the occurrence of this species in the eastern parts of Asia. Middendorff quotes it from Taimyr and Radde from the delta of the Upper Angara, but later travelers have not found it there. Swinhoe did not obtain it in China, nor has it been found in Japan, the Amur-province, the Kuriles, the shores of the Okotsk Sea, or Kamtschatka. Mr. Nelson, however, (Cruise Corwin, p. 109) noted it on the northeastern Siberian coast of the Arctic Ocean and Nordenskjöld collected a specimen there, at Pitlekaj, July 5, 1879. The species has been found on several of the Aleutian Islands belonging to America.

The specimen collected by me measures:

♂ *ad., U. S. Nat. Mus. No.* 92901; *L. Stejneger No.* 2129. *Bering Island, June* 5, 1883.—Total length 371mm. Tail beyond wings, 8mm. Wing, 280mm. Tail-feathers, 185mm. Culmen, 32mm. Tarsus, 17mm. Middle toe with claw, 22mm. Iris dark brown. Bill carmine, tip slightly dusky. Feet vermilion, tinged with carmine.

Family STERCORARIIDÆ.

25. Stercorarius parasiticus (Lin.)

1758.—*Larus parasiticus* Lin., Syst. Nat., 10 ed., I, p. 136 (*nec* Less. qui *longicaudus*).—*Stercorarius p.* Dall & Bannist., Tr. Chicag. Acad., I, 1869, p. 303.—Coues, in Elliott's Affairs Alaska, p. 196 (1875).—Elliott, Monogr. Seal Isl., p. 132 (1882).—Turner, Auk, 1885, p. 158.—*Lestris p.* Dall., Avif. Aleut. Isl. west Unal., p. 9 (1874).—Taczan., Bull. Soc. Zool. France, 1876, p. 262.—*Id., ibid.*, 1883, p. 341.—*Id.*, Orn. Faun. Vost. Sibir., p. 64 (1877).

1773.—*Larus crepidatus* Banks in Hawkesw., Voy. II (p. 15).—*Stercorarius c.* (?) Blakist. & Pryer, Tr. As. Soc. Jap. X, 1882, p. 105.—Bean, Pr. U. S. Nat. Mus., 1882, p. 169.—Nelson, Cruise Corwin, p. 110 (1883).—Blakist., Amend. List B. Jap., p. 35, (1884).—Seeb., Ibis, 1884, p. 32.

1826.—*Catarractes parasita* Pall., Zoogr. Ross. As. II, p. 310.—*Lestris p.* Middend., Sibir. Reis., II, 2 (p. 241) (1853).—Swinh., P. Z. S., 1863, p. 328.

On the Commander Islands the dark form is the most common. A few only with white lower surface were seen, and one secured. This species is found mostly on Bering Island where it breeds on the great tundra, or rather swamp, near the village. In 1883 the first ones made their appearance on the 4th of May. In the autumn they seem to feed to a great extent on the berries of *Empetrum nigrum*, and their excreta at that time are colored dark blue. The natives call them by the Russian name "*Rasbojnik.*"

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond next longest tail feather.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw	Remarks.
			1882.		*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	
89083	1122	Bering Island.	May 30	♂ ad.	336+80	.....	305	212	29	43	43	Dark phase.
89084	1123	....do ...	May 30	♀ ad.	420+55	.....	318	200	30	44	.....	Do.
89085	1411	....do ...	Aug. 7	♀ ad.	410+65	.....	326	191	31	44	43	Do.
89086	1412	....do ...	Aug. 7	♀ ad.	420+70	.....	322	202	29	43	43	Do.
			1883.									
92902	2162	....do ...	June 11	♂ ad.	389+65	40	320	182	30	44	41	Light phase.

No. 89084.—Iris dark brown. Bill brownish black; more greenish gray at base of upper mandible. Feet pure black.

No. 89085.—Iris, dark hazel. Bill, horny gray; blackish at tip. Feet, black.

No. 92902.—Iris, dark brown. Bill, blackish brown, lighter brownish gray at base of lower mandible; nasal shield and culmen, still lighter. Feet, black, the left tarsus with a whitish spot in front. Testes, small.

One egg was collected on May 29, 1882 (No. 1115, U. S. Nat. Mus. No. 21799), and measures 57 by 41.25^{mm}.

26. Stercorarius longicaudus VIEILL.

1819.—*Stercorarius longicaudus* VIEILL., Nouv. Dict. d'Hist. Nat. XXXII, p. 157.—TURNER, Auk, 1885, p. 158.

1822.—*Lestris buffonii* BOIE, Isis, 1822, p. 562.—MIDDEND., Sibir. Reise, II, 2 (p. 241) (1853).—SWINH., P. Z. S., 1863, p. 328.—TACZAN., Bull. Soc. Zool. France, 1876, p. 262.—*Id.*, *ibid.*, 1883, p. 341.—*Id.*, Orn. Faun. Vost. Sibir., p. 64 (1877).—*Stercorarius b.* DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 304.—COUES, in Elliott's Affairs Alaska, p. 197 (1875).—ELLIOTT, Monogr. Seal Isl., p. 132 (1882).—BLAKIST., Amend1List B. Jap., p. 35 (1884).—SEEB., Ibis, 1884, p. 176.

1826.—*Stercorarius cepphus* STEPH., Gen. Zool. XII, i, p. 211.—*Lestris c.* PALMÉN, Swed. Cat. Lond. Fish. Exh., p. 201 (1883).

1828.—*Lestris parasitica* LESSON, Man. d'Orn., II, p. 288 (*nec* LIN.).—*Stercorarius p.* (?) BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 105.— NELSON, Cruise Corwin, p. 111 (1883).

The Long-tailed Jæger in the adult plumage resembles very closely the light phase of the foregoing species, but even young birds of the two species may be easily distinguished.

Some stages may at once be recognized by the coloration alone. It has been given as an unfailing mark that in Richardson's Jæger the shafts of all or most of the primaries are white, while in *longicaudus* only the two first ones are so colored. Such is certainly the rule, but the

examination of a very large series of both species has convinced me that all transitional stages occur, as birds are found having the two, three, four, five, or six first primaries with white shafts, and that these characters, consequently, are of little value. The coloration may be depended upon as a safe guide for the identification in the following cases:

If the bird has wholly black legs, tarsi included, then it belongs to *parasiticus* (*crepidatus*), even if light colored underneath. This character, however, is only safe when applied to rather fresh specimens, as the light tarsi often darkens so much in museum specimens that it is difficult to decide upon the original color.

If the bird is sooty all over, it is *parasiticus*.

If it has the tarsi light blue (Saunders, P. Z. S., 1876, p. 331, gives the color as yellowish olive; that is only the case in dried specimens, not in the fresh bird), simultaneously with uniformly soot-colored under wing coverts, then it certainly belongs to *longicaudus*.

In all other cases the proportions of the different parts of the bill are the only reliable characters. *S. parasiticus* is recognizable by having the gonys shorter and the nasal shield longer, while in *longicaudus* these proportions are reversed. The length of the gonys, as compared with the breadth of the bill across the points of the loral antiæ is a good character of the bird when still in the flesh, and so is the position of the angle of the gonys in its relative position to the nostrils, the former being placed much in front of the anterior border of the nostrils in *parasiticus*, while in *longicaudus* it is placed right below that same point. But museum specimens may be identified by measuring the distance from the anterior border of the nostrils to the tip of the bill and compare it with the length of the nasal shield along the culmen. In *longicaudus* the two distances are of equal length, while in *parasiticus* the nasal shield is much longer.

These characters hold good at least in birds one year old just before the second moult, and in the adults. Whether young ones in the first plumage are distinguishable in the same manner I cannot say with certainty, as I have no access to a specemen of *longicaudus* of that age, but I have little doubt that they are, as the essential characters of *parasiticus* are very well borne out in several young specimens before me.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond next longest tail-feather.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
			1883.		*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
9205	2127	Bering Island.....	June 5	♂ ad.	385+175	42	310	302	27	41	37
9203	2193	....do.....	June 21	♂ ad.	400+120	30	310	265	27	43	38
9204	2226	Copper Island.....	July 3	♀ horn.	381+117	28	311	238	26	44	39

No. 9205.—Iris dark brown. Bill black. Tarsus light grayish blue; naked part of tibiæ, toes, and webs black. Stomach empty. Extremely fat.

No. 9203.—Iris dark brown. Bill blackish brown, lighter at base, and nasal shield tinged with olive. Tarsus and hind toe light grayish blue; tibiæ, toes, and webs black. Testes small. Stomach contained *Arvicola rutila*. Rather fat.

No. 9204.—Iris dark brown. Bill blackish brown, nasal shield olive gray. Naked part of tibiæ, tarsus, and portion of toes nearest to the tarsus, light grayish blue, remainder, including hind toe, black. Eggs in ovary very small and undeveloped. In stomach only a few fish-bones.

The Long-tailed Jæger does not breed on the islands. Those which I met were only adult males or birds of the first year. I should not be surprised, however, if this species in a near future might be induced to settle on Bering Island on account of the enormous increase of *Arvicola rutila*, which has been introduced into the island within the last ten years.

Superfamily PROCELLAROIDEÆ.

Family DIOMEDEIDÆ.

27. Diomedea albatrus PALL.

1769.—*Diomedea albatrus* PALL., Spicil. Zool., V, p. 28.—*Id.*, Zoogr. Ross. As., II, p. 308 (1826).—SWINH., Ibis, 1864, p. 423.—SEEB., Ibis 1884, p. 176.—TURNER, Auk, 1885, p. 158.

1820.—*Diomedea chinensis* TEMM., Man. d'Orn., 2d ed., I, p. cx.

1835.—*Diomedea brachiura* TEMM., Pl. Color., V, livr. 94, pl. 554.—TEMM. & SCHLEG., Faun. Japon. Aves (pl. 66) (1849).—KITTL., Denkw., I, pp. 234, 248.—SWINH., Ibis 1860, p. 67.—*Id.*, *ibid.*, 1863, p. 431.—*Id.*, *ibid.*, 1864, p. 423.—*Id.*, *ibid.*, 1867, p. 226.—*Id.*, *ibid.*, 1870, p. 366.—*Id.*, P. Z. S. 1883, p. 329.—*Id.*, *ibid.*, 1871, p. 422.—CASSIN, Pr. Acad. Philada., 1862, p. 326.—FINSCH, Abh. Brem. Ver. III, 1872, p. 83.—DALL, Avif. Aleut. Isl. west Unal., p. 8 (1874).—COUES, in Elliott's Aff. Alaska, p. 194 (1875).—TACZAN., J. f. Orn., 1876, p. 202.—*Id.*, Orn. Faun. Vost. Sibir, p. 65, (1877).—*Id.*, Bull., Soc. Zool. France, 1877, p. 40.—BLAKIST. & PRYER, Ibis, 1878, p. 218.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 190.—*Id.*, *ibid.*, X, 1882, p. 106.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 170.—ELLIOTT, Monogr. Seal Isl., p. 131 (1882).—NELSON, Cruise Corwin, p. 111 (1883).—BLAKIST., Amend. List B. Jap., p. 35 (1884).

Pallas's description of *Diomedea albatrus* is based upon a specimen sent from Kamtschatka to the Academy of St. Petersburg by Steller,

and the description leaves no doubt whatever that it is the bird subsequently called *Diomedea brachiura;* the measurements alone are quite conclusive.

There cannot be the slightest doubt that plate 963 of "Planches Enluminures" represents the young of the present species, and as Temminck bestowed the name *chinensis* on that figure, the latter name, as given in 1820, would take the precedence over the same author's *brachiura*, which is fifteen years later, had it not been for Pallas's name.

Not having seen a specimen purporting to be Swinhoe's *derogata* I am unable to form an opinion as to its validity.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Stretch of wings.	Wing.	Tail-feathers.	Chord of culmen.	Tarsus.	Middle toe with claw.
			1882.		*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92906	1660	Bering Island.....	Sept. 21	♂ ad.	925	2370	575	147	131	98	136
92907	1225	Copper Island.....	June 22	jun.	870	.....	560	144	132	105	.....

No. 92906.—Bill reddish violet; nail whitish. Feet grayish blue with dusky on the joints and webs.
No. 92907.—Iris dark brown. Bill violet flesh color; nail more bluish white. Feet as the bill, only somewhat tinged with brownish gray. Sexual organs undeveloped.

The Albatros—by which name it is known to the natives also—by no means is a rare visitor to the Commander Islands, where I never saw *D. nigripes* AUD., a species which, on our northward voyage from San Francisco, left us before we reached the Aleutian Chain. They do not remain near the islands during the winter—at least I saw none—but the first ones were observed as early as the middle of March. These were old birds in the white plumage, and on April 14th not less than eight were seen at one time near the village. During the summer, however, the black young birds of the foregoing year are more numerous than the adults, of which a few remain all summer, though without breeding, of course. In the middle of the immense flocks of *Lunda*, *Fratercula*, and *Fulmarus*, which in quiet weather rest on the surface of the sea, covering many acres, can always be seen one or two of these comparatively gigantic dark birds, which, however, are the first ones to take the wing at the approach of a boat or a bajdarka. This species is remarkably shyer than *D. nigripes*.

I also saw it in Kamtschatka, on the Bay of Avatscha, and suspect that it is a young bird of this species which has been reported by Mr. Taczanowski under the name of *nigripes* AUD. as having been taken in Kamtschatka.

Family PROCELLARIDÆ.

28. Fulmarus glacialis glupischa STEJNEGER.

1769.—*Procellaria glacialis* PALL., Spicil. Zool., V. p. 28.—*Id.*, Zoogr. Ross. As., II, p 312 (*nec* LIN.) (1826).—SCHRENCK, Reis. Amurl., I, p. 517 (1860).—TACZAN., Bull. Soc. Zool. France, 1877, p. 40.—*Id.*, Orn. Faun. Vost. Sibir., p. 65 (1877).—*Fulmarus g.* BLAKIST. & PRYER, Ibis, 1878, p. 218.—SEEB., Ibis, 1879, p. 25.

1838.—*Procellaria pacifica* AUDUB., Orn. Biogr. V (p. 331) (*nec* GMEL., 1788).—TACZAN., Bull. Soc. Zool. France, 1882, p. 398.—*Fulmarus p.* CASSIN, Pr. Philada. Acad., 1862, p. 327.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 190.—*Id.*, *ibid.*, X, 1882, p. 106.—BLAKIST., Amend. List B. Jap., p. 21 (1884).

1883.—*Priocella tenuirostris* NELSON, Cruise Corwin, p. 112 (*part. nec* AUD.; cfr. STEJNEGER, Auk, 1884, p. 233).

1884.—*Fulmarus glacialis glupischa* STEJNEGER, Auk, 1884, p. 234.—TURNER, Auk, 1885, p. 158.

An examination of thirty-six specimens of arctogæan Fulmars has given the following results:

(1.) Both in the Atlantic and in the Pacific two very easily distinguishable forms occur, one almost uniform *dark* ashy or nearly sooty, the other white with pearl-blue mantle. The former is not to be confounded with the young bird of the latter, as enormous breeding colonies of the sooty form exclusively are met with. The young birds of the white forms have the head and the greater part of the lower surface suffused with light gray, yet they can never be mistaken for the dark ones, and I doubt very much if any intergradation *between the fully matured adults* of the two forms or phases can be proven. I have observed thousands and tens of thousands of the dark form breeding, not finding a single one perceptibly lighter, although a small colony of the white form was breeding in the neighborhood, but separate from the dark ones; nor were any of the light phase perceptibly darker than usual; and in no case were white and dark birds paired together.

(?.) The Atlantic and Pacific birds show hardly any—even an average—difference in the shape of the bill, the form of the nasal tubes, &c., upon which to base a separation of them, but there seems to be a decided difference in the coloration of that member. In all the birds, dark and light ones, from the Pacific the bill is light-colored, only with a little duskyon the borders of the different lamellæ and on the culmen between

the nasal tubes and the nail, and the nasal tubes themselves are alway light-colored, never dark, much less any other part of the bill. The r verse is the case in the different forms of the Atlantic birds, in whic the nasal tubes seem to be dark-colored, and in a great many, if n all, dark-colored individuals, the whole bill has a brown color. The seems also to be a constant difference in the color of the iris of the tw races, as it is given as yellow for the old Atlantic bird, while in the P cific variety it is invariably dark brown, although it should be stated th Faber describes the Icelandic birds as having the irides "*nigro fusci*

The accounts of the exact colors of the light parts of the bill in t Atlantic birds are very uncertain and unsatisfactory. In the Pacif race I found two very different styles of color of the bill. All tho which I examined at the breeding places, whether dark or white, had whitish bill with faint bluish, greenish, and pinkish shades, cons quently a kind of mother-of-pearl color. A faithful picture was pr pared by me from a fresh specimen and is reproduced as fig. 2, on p vi, giving an exact representation of the color as it was invariably foun in the adult breeding birds from early spring until August, at leas when I observed the last ones. The other style is represented in fi 1, pl. vi, also colored from the fresh specimen, an old white bird fro Bering Island, obtained in February. The bill is absolutely yello with tinges of greenish and orange brownish. As this was the onl winter bird I got, I cannot say whether this difference in the colors the bill is due to season, but I really suspect it is, as I saw none amon the thousands and thousands of summer birds with yellow bill, althoug I had excellent opportunity for observation, and I paid a special an careful attention to the subject, as will be seen. Most of the Atlanti observers record the color of the bill as yellow; is that not due to th fact that they had winter specimens before them? Faber, one of th most conscientious observers, describes the color of the bill of the Ic landic bird (in summer plumage, as he only got a few winter specimen as being "grisescens, dertro adunco flavescenti. * * * nares * * nigræ." (Beytr. Arct. Zool., II, Isis, 1824, p. 786), which seems to co firm my opinion of a seasonal change in the color of the bill, as Na mann, a not less careful observer, describes the bill of the old bird a beautiful and rich yellow with the nasal tubes slaty black, he havin probably had only winter birds taken off the coast of Germany (Natur Vög. Deutschl., X, p. 594: "Der Schnabel * * * an seinem gro sen Haken und dem Spitzentheil des Unterschnabels sehr schön hoch

gelb, ins Orangefarbene spielend, der übrige Theil, welchen die dunkele Längenfurche an der Seite in zwei gleiche Hälften zu theilen scheint, blaszgelb, der hintere Theil des Oberschnabels nur der Schneide entlang hochgelb, nach oben blasser, hier vom Schieferschwarz der Nasenröhre * * * begrenzt. * * *" Cfr. also Kumlien's description of the bill of the white phase "during the latter part of August, September, and fore part of October": "bright yellow bill," Bull. U. S. Nat. Mus., No. 15, p. 101.)

(3.) While the white phases of the Atlantic and the Pacific races are indistinguishable as far as the coloration of the feathering is concerned, the dark phases are very readily distinguished, the Pacific one being much darker all over. Its color is a saturated, plumbeous ash, more or less tinged with sooty brown (in Museum specimen the color soon turns brownish all over on account of the oxydation of the fatty matter, I suppose). The dark phase of the Atlantic bird is somewhat lighter and of a more ashy hue. Both forms have, when alive, or freshly killed, a tender, silky, olive-greenish gloss on the mantle as described by Mr. Kumlien (Bull. U. S. Nat. Mus., No. 15, p. 101) in the Atlantic race, and also observed by me in the birds of the Commander Islands.

(4.) There seems to be a decided difference in the geographical range of the two phases in both oceans; it appears that the dark phase in both instances is a particularly western bird, while the light colored ones seem to have a more eastern distribution.

If the dark form had occurred breeding in Iceland, where Faber found the white one exceedingly numerous, he could scarcely have escaped mentioning it. Nor does it seem to have been found in Saint Kilda* by John Macgillivray, and the form, at present, breeding on the Fær Islands seems also to be the unmixed light phase; in fact, I do not think the dark form has been found breeding in any number before in Davis's Straits and adjacent waters, where it occurs in great abundance. In the Pacific a similar distribution obtains, the dark form being comparatively scarce on the American side, while it is by far the predominating form on the Asiatic shore, at least as far south as Kamtschatka. The dark phase was found by me on the Commander Islands in countless

*From Mr. Dixon's interesting account of "The Ornithology of Saint Kilda," published in the Ibis for 1885, pp. 69, *seqv.*, received since the above was written, it is learned that the "natives assert that there are two kinds, a light and a dark one, but the latter is rare." This substantiates my view as to the scarcity of the dark form in the east. On p. 94 Mr. Dixon has published a condensed account of the conclusions I have arrived at, and which I communicated to Mr. Seebohm during his visit in Washington last autumn.

numbers. In the colonies breeding on Bering Island not a single light bird was to be seen, and the same was the case at the rookeries on the northern part of Copper Island, for example, that close to the village. At Glinka, near the southern extremity of the latter island, were found a few small white colonies, but the percentage of the light-colored birds was quite trifling, as I estimated it to be between 1 and 5 per cent. The accounts of the birds taken in Kamtschatka and the Kurile Islands are exceedingly meager, but indicate the dark phase as far as they go.

(5.) In the Atlantic occurs a smaller race, *F. glacialis minor* KJÆRB., besides the typical *F. glacialis*, which also has two phases. In the Pacific another race occurs, which is fairly distinguishable from *F. glacialis glupischa*, viz, *F. g. rodgersii*, characterized by its pale color and the great amount of white. The latter seems to be a northern form, apparently without any dark phase.

The question now arises as to the real nature of the two phases. A name is easily found and we may take our refuge under the shelter of "dichromatism." This does not solve the question, however, which is a most interesting one. What is dichromatism, its causes, its nature? We have one kind in raptorial birds, especially the owls, another among the herons; a third kind is that of *Stercorarius parasiticus*, and we may in this connection also quote the Arctic Fox (*Vulpes lagopus*), besides many other cases, but only future studies of the living birds will enable us to obtain satisfactory results.

List of specimens collected.

WHITE PHASE.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wing.	Tail-feathers.	Chord of culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92908	1900	Bering Island.....	Feb. 7, 1883	♂ ad.	471	22	320	117	36	52	.....
92909	2267	Copper Island.....	July 14, 1883	♀ ad.	458	27	328	122	36	51	.....

DARK PHASE.

89138	1212	Copper Island.....	June 8, 1882	♀ ad.	425	312	312	120	35	.....	62
92910	2008	Bering Island.....	May 4, 1883	.....	.....	.....	330	132	36	50	65
92911	2233	Copper Island.....	July 5, 1883	♂ ad.	480	15	333	131	37	51	67

No. 92908.—Iris dark brown. Bill light greenish lemon-yellow, the middle of each piece or lamella orange brownish, and the edges blackish; along tomia of lower mandible and chin-angle flesh-color. Eye-ring dark brownish gray. Feet whitish with a faint greenish tinge; joints, tarsus behind and toes below, outer web and anterior border of inner web blackish brown; nails horny white. Stomach filled with feathers. Exceedingly lean.

No. 92909.—Iris dark brown. Bill whitish, tinged with flesh-color and without dusky on the sutures; nail tinged faintly with yellowish. Feet very light and pure whitish flesh-color, without any trace of dusky above or below, and without trace of any bluish or greenish tinge; joints more reddish; nails light horny brownish.

No. 89138.—Iris dark brown. Bill greenish white, with the sutures and the space between the nostril and the nail, as also the tip of the latter, blackish. Feet dirty white with a faint greenish blue tinge; the joints and the outside of the tarsus, as also the webs, except the base, blackish; tarsus behind and toes below black.

No. 92910.—Bill whitish with a faint tinge of greenish blue and yellowish, here and there with a light rosy shade; sutures and terminal part of nail blackish. Feet whitish with a faint greenish tinge; webs of the same color, their outer edge being narrowly bordered by black; along hind side of tarsus and under side of toes only trace of blackish.

No. 92911.—Iris dark brown. Bill exactly as the colored drawing of No. 2008 (the foregoing, pl. vi, fig. 12), only that the dusky on the lower mandible forms a continuous line between the nail and the malar apex. Feet whitish with a wash of bluish flesh-color, with brownish on the joints, and the fore border of the webs blackish; tarsus behind and toes below dark brownish gray. Very fat.

The "Glupisch" is one of the commonest summer visitors to the islands, and breeds in enormous numbers in suitable places, that is to say, in high and steep rocky bluffs and promontories boldly rising out of the sea 300 to 800 feet high, and I have spent hours under their rookeries listening to their whinnying voice and watching their high and elegant flight in sailing out and in and around the cracked rocks like bees at an immense bee-hive. I have mentioned above that nearly all the birds belonged to the dark phase, and that only a very small percentage of white birds breed, apart from the dark ones, on Copper Island.

The Fulmar is the first one of the non-resident water-birds to arrive at the rookeries in early spring, usually in March, the order of arrival being *Fulmarus*, *Uria arra*, *Lunda cirrhata*, *Fratercula corniculata*. One specimen of the white form was obtained on Bering Island, February 7, which would indicate that the advance guard had already reached the islands by that time, or else, what I am rather inclined to believe, that many of the birds pass the winter on the open ocean not so very far from the shores they inhabit in summer.

The eggs are dull white without spots, measuring as follows:

U. S. Nat. Mus. No.	Collector's No.	Locality.	Date.	Long diameter.	Short diameter.
				mm.	mm.
21886	2243	Copper Island	July 12, 1883	75	49
21887	2244	do	July 12, 1883	71.5	48.5
21888	2247	do	July 13, 1883	71.5	51
21889	2257	do	July 13, 1883	68	50
21890	2258	do	July 13, 1883	71.5	48.5

These eggs all belonged to birds of the dark phase.

29. Puffinus tenuirostris (TEMM.)

1769.—? *Procellaria nigra* PALL., Spicil. Zool., V., p. 28.
1826.—*Procellaria acquinoctialis* PALL., Zoogr. Ross. As., II, p. 314 (*nec* Lin.).
1836.—*Procellaria tenuirostris* TEMM., Pl. Color., V, Liv., 99, text only (*nec* Audub., 1839).—TEMM. & SCHLEG., Faun. Jap. Av. (p. 131, pl. 86), (1849).—SCHLEG., Mus. P. B. Procell., p. 27 (1863).—*Nectris. t.* CASSIN, Pr. Acad. Philada., 1862, p. 327.—DALL & BANNIST., Tr. Chicag. Acad., 1, 1869, p. 303.—BAIRD, Tr. Chic. Ac., I, 1869, (p. 322), pl. xxxiv, fig. 2.—*Puffinus t.* FINSCH, Verh. Brem. Ver., III, 1872, p. 83.—BLAKIST. & PRYER, Ibis, 1878 p. 218.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 191.—*Iid.*, *ibid.*, X, 1882, p. 107.—BLAKIST., Amend. List B. Jap., p. 23 (1884).—*Priocella t.* (!) NELSON, Cruise Corwin, p. 112 (1883) (*nec* AUDUBON!! cf. STEJNEGER, Auk, 1884, p. 233).—COUES, Auk, 1884, p. 80.
1854.—*Puffinus curilicus* LICHT., Nomencl. Mus. Berol., p. 100 (*part*).—*Procellaria c.* KITTL., Denkw., I, p. 296 (1858).

The "*Tschornij Glupisch*" is rather scarce on the islands, although I feel convinced that a few breed there. I saw a small flock on the 22d of August, 1882, at the entrance of Lissonkovaja Buchta, southern part of Bering Island, leaving the whale carcass upon which they were sitting at our approach. A specimen was obtained on Copper Island in June, 1883. It had been captured by one of the natives on the 17th of June, skinned and dried flesh side out, awaiting my arrival. I made afterwards a tolerably satisfactory (considering the circumstances) skin out of it. Its dimensions are:

U. S. Nat. Mus. No. 92912; *L. Stejneger, No.* 2209. *Karabelnij, Copper Island, June* 17, 1883. Wing 285^{mm}. Tail-feathers 91^{mm}. Chord of culmen 33^{mm}. Tarsus 54^{mm}. Middle toe with claw, 60^{mm}.

Another specimen of the Slender-billed Shearwater was secured on Bering Island by one of the natives and prepared by him for Dr. Dybowski, in 1882, before my arrival to the islands. Remarkably enough, neither Taczanowski nor Dybowski have mentioned the species in their recent catalogues of birds from that region. I had the opportunity of examining the specimen and made the following notes:

Chord of culmen 34^{mm}. Commissure 49^{mm}. From anterior border of nostrils to tip of maxilla 24^{mm}. From malar apex to tip of mandible 32^{mm}. Height of bill in front of nostrils 7.5^{mm}. Tarsus 54^{mm}. Middle toe with claw 63^{mm}. Wing 290^{mm}. Tail-feathers 92^{mm}. Graduation of tail 21^{mm}. Upper surface dark sooty brown, almost black on wing and tail feathers, lighter and more grayish below. Chin and upper throat almost whitish gray. Feet (in the dried specimen) on the outer side dark brownish, pale on the inner side, almost black below.

The specimen obtained by me is similarly colored but the chin and throat are not so light.

30. Oceanodroma leucorhoa (VIEILL).

1817.—*Procellaria leucorhoa* VIEILL., N. Dict. d'Hist. Nat., XXV, p. 422.—BLAKIST. & PRYER, Ibis, 1878, p. 218. -*Id.*, Tr. As. Soc. Jap. VIII, 1880, p. 191.—*Id.*, *ibid.*, X, 1882, p. 106.—BLAKIST., Amend. List B.Jap., p. 35 (1884).—SEEB., Ibis, 1884, p. 33.—*Cymochorea l.* NELSON, Cruise Corwin, p. 113 (1883).—TURNER, Auk, 1885, p. 158.

1820.—*Procellaria leachii* TEMM., Man. d'Orn., 2 ed., II, p. 812.—SCHRENCK, Reis. Amurl., I, p. 515 (1860).—*Thalassidroma l.* DALL & BANNIST., Tr. Chic. Ac., 1869, p. I, 303.—DALL., Avif. Aleut. Isl. west Unal., p. 8 (1874).—TACZAN. Orn. Faun. Vost. Sibir., p. 66 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 40.

1826.—*Procellaria pelagica* PALL., Zoogr. Ross. As., I, p. 316 (*nec* LINN.).

1858.—*Thalassidroma scapulata* KITTL., Denkw., II, p. 191 (Brandt, Icon. ined. pl. iv, fig. 5).

I can find no structural character that will satisfactorily separate the species which usually have been kept apart in the two genera *Oceanodroma* and *Cymochorea*. Even the type of the latter, *leucorhoa* Vieill., comes very close to *Oceanodroma*, but still more so does *C. melania* BP., which has the graduation of the tail fully as great as in *O. furcata*, and the outer rectrices tapering toward the tip which is just perceptibly more truncate than in the latter. This also has the notch of the truncated end of the other rectrices a trifle deeper than in typical *Cymochorea*. *O. furcata* and *C. melania* also agree in the stoutness of the bill. The tail of *furcata* is a little longer than in *leucorhoa* and *melania* as compared with the wing, the formula of which is somewhat variable, but, on the whole, identical in the three species. Even the coloration is not so radically different as might appear at first sight, for the species of *Cymochorea* are more or less washed with ashy gray, a color especially noticeable in fresh birds, while in old museum specimens the color turns brown, as I suppose, from oxydation of the fat contained in the feathers. This is a fact which should always be borne in mind when comparing old skins of water birds. The white feathers turn yellow, and the gray ones become brownish, as I have invariably found it to be the case in *Laridæ*, *Tubinares*, and *Alcidæ*.

Oceanodroma, as the older name (1852), will therefore take precedence over the younger, *Cymochorea* (1864), which can only be retained as a subgeneric term designating the group, the dominating color of which is fuliginous in contradistinction to the light ashy tint of the typical species of *Oceanodroma*.

The "*Malinka tschornaja Sturmofka*," or "small black Petrel," is on the Commander Islands only known from Copper Island, where it breeds at

Tschornij Mys, together with *O. furcata*. I was not so fortunate, however, as to obtain any specimen during my stay there, but the occurrence of the species is beyond doubt.

31. Oceanodroma furcata (GMEL.).

1788.—*Procellaria furcata* GMEL., Syst. Nat., I, p. 561.—KITTL., Denkw., II, p. 319 (1858).—SCHLEG., Mus. P. B. Procell., p. 3 (1863).—BLAKIST. & PRYER, Ibis, 1878, p. 218.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 191.—*Id.*, *ibid.*, X, 1882, p. 106.—BLAKIST., Amend. List B. Jap., p. 35 (1884).—SEEB., Ibis, 1884, p. 33.—*Thalassidroma f.* GOULD, Zool. Sulphur., p. 50, pl. xxxiii (1844).—FINSCH, Abh. Brem. Ver., III, 1872, p. 83.—DALL, Avif. Aleut. Isl., Unal. eastw., p. 7 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 9 (1874).—*Oceanodroma f.* NELSON, Cruise Corwin, p. 113 (1883).—STEJNEGER, Naturen, 1884, p. 55.—TURNER, Auk, 1885, p. 158.

1826.—*Procellaria orientalis* PALL., Zoogr. Ross. As., II, p. 315.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wings.	Tail-feathers.	Chord of culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
89136	1196	Copper Island	— —, 1882	.....	.....	.....	161	97	15	26	28
92914	2132	Bering Island.....	June 7, 1883	♂ ad.	220	0	156	97	16	27	29
92915	2240	Copper Island.....	July 12, 1883	♂ ad.	232	0	159	98	15	27	29
92913	2271	....do	July 18, 1883	♀ ad.	235	0	164	107	16	26	28

No. 92914.—Found dead on the beach. Bill and feet black. Extremely emaciated. Testes very small, undeveloped.

No. 92915.—Iris dark hazel. Bill and feet black.

No. 92913.—Iris dark hazel. Bill and feet black.

The Fork-tailed Petrel breeds on Copper Island, where it is known by the natives as the "Sturmofka." I do not know of its breeding at any place on Bering Island. On July 12, 1883, I visited the precipitous rocks of Tschornij Mys, between Karabelnij and Glinka, on the eastern side of Copper Island, where a small colony of these graceful petrels were breeding. The eggs, a single one in each nest, were deposited in deep holes in the steep basaltic rocks, 3 feet or more deep, and it was only with great difficulty that a few could be secured. The birds were taken on the nests, and in some the females, in others, the males were sitting.

The eggs, which were in different stages of incubation, are white without gloss; No. 21786 has plenty of the minutest dark specks evenly dusted over the blunt end; in No. 21785 these specks are a little larger,

purplish black, and form a circlet around the blunt end, while some few lilac spots shine through from the deeper layers.

The eggs measure:

U. S. Nat. Mus. No.	Stejneger No.	Locality.	Date.	Long diameter.	Short diameter.
				mm.	*mm.*
21785	2237	Copper Island	July 12, 1883	34	26
21786	2238	....do	July 12, 1883	32.5	25
21787	2239	....do	July 12, 1883	34	26.5

Order GRALLÆ.

Superfamily SCOLOPACOIDEÆ.

Family CHARADRIIDÆ.

32. Hæmatopus osculans Swinh.

1826.—*Hæmatopus hypoleuca* Pall., Zool. Ross. As., II, p. 129 (*part*).
1853.—*Hæmatopus ostralegus* Middend., Sibir. Reise, II, 2 (p. 213), (*nec* Lin.).—Schrenck, Reise Amurl., I, p. 413 (1860).—Swinh., Ibis, 1860, p. 63.—*Id.*, *ibid.*, 1861, pp. 261 and 342.—Przew. Putesch. Ussur. (n. 157) (1870).
1863.—*Hæmatopus longirostris* Swinh., Ibis, 1863, p. 406 (*nec* Vieill.).—*Id.*, P. Z. S., 1863, p. 310.
1871.—*Hæmatopus osculans* Swinh., P. Z. S., 1871, p. 405.—*Id.*, Ibis, 1875, p. 129.—*Id.*, *ibid.*, 1875, p. 453.—Pelz., Ver. Zool. Bot. Ver. Wien, 1873, Extr., p. 6.—Taczan., Bull. Soc Zool. France, 1876, p. 249.—*Id.*, *ibid.*, 1883, p. 339.—*Id.*, Orn. Faun. East Sib., p. 53 (1877).—Blakist. & Pryer, Ibis, 1878, p. 219.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 193.—*Id.*, *ibid.*, X, 1882, p. 109.—Seeb., Ibis, 1879, p. 26.—Blakist., Amend. List B. Jap., p. 11 (1884).

The eastern Oyster-catcher is nearly related to the European species *H. ostralegus* L., and more nearly so, perhaps, to the form occurring in New Zealand and Australia, *H. longirostris* Vieill. It has the black edgings of the upper tail coverts in common with the latter, but as to the length of the bill and the amount of white on the wing-feathers it is intermediate between both. As I have seen no intergradation, however, I shall keep these three forms apart as distinct species, although the probability is that it at last will be found necessary to apply a trinominal to the eastern bird, *H. ostralegus osculans* (Swinh.). One of my birds, No. 92884, has, in fact, the shaft of all the primaries as in *ostralegus*, but as the bird is a young one nothing can be concluded from it. On the other hand, the black on the upper tail-coverts forms two to three broad terminal cross-bars on each feather, the white interspace being strongly tinged with rusty buff. In adult birds from China I find only more or less broad black edging on these feathers, and in one specimen these are nearly obsolete, too, and so are they in an example of *longirostris* from New Zealand; but as the edges are very

worn and abraded, the black may have been much more conspicuous in the fresh plumage. Further abrasion might perhaps have obliterated the black edgings altogether, a possibility to be taken into account by persons comparing these closely allied forms. I find that Naumann describes the bill of the young of the year of *H. ostralegus* as having the tip of the bill yellow. In my birds, when fresh, this part was decidedly dark, and the dusky color is still very pronounced in the dried specimens. It may also be worth stating that my examples have no whitish patch on the fore part of the neck, as is common in the European bird when young.

a¹. Rump white.
  b¹. Upper tail-coverts pure white, without black edgings; bill shorter.
    H. ostralegus LIN.
  b². Tips of upper tail-coverts edged with black; bill considerably longer.
    c¹. Shafts of primaries from the third white before the tip; second primary with a broad white stripe along the border of the inner web.
      H. osculans SWINH.
    c². Shafts of all the primaries wholly black; second primary without white stripe on the inner margin ..... *H. longirostris* VIEILL.
a². Rump dark, of the same color as the back..... *H. palliatus* TEMM.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
92884	2607	Velutschka, East Kamtschatka ..	Sept. 21, 1883	♀ jun.	460	2	267	103	77
92889	2608	Saranna, East Kamtschatka	Sept. 22, 1883	♂ jun.	440	0	245	105	72

No. 92884.—Iris "raw umber." Bill orange-red; tips dusky. Naked eye-ring orange. Feet pale bluish flesh-color.

The Oyster-catcher occurs only regularly along the coast of the peninsula, where I saw specimens shot in the latter part of May, 1883. During a short trip to Velutschka and Saranna, September, 1883, we met a few families, out of which I only got two young birds on account of their extreme shyness. The Russians of Kamtschatka apply to this bird especially the name "*Petuschók*" (pl. "*Petusehki*"), a chicken, a term used for *Simorhynchus pygmæus* by the natives of Bering Island, for *Leucosticte griseonucha* by those living on the Prybiloff Islands (accord-

ing to H. W. Elliott), and to other birds in different parts of the vast empire where the Russian tongue is spoken.

This bird comes only as a rare visitor to the islands during the migration seasons. This is rather strange, as it inhabits the nearest coast of the mainland, and as the Komandorski group offers every favorable condition to these bright, noisy, and shy fellows. Besides, an allied species (*H. bachmani* AUD.) frequents the American islands of the Aleutian chain.

On the 19th of June, 1883, about noon, I observed two Oyster-catchers on the low sandy beach opposite the village of Bering Island. Crossing the river I followed them for more than 3 miles, but their shyness prevented me from securing a specimen. The pursuit had then to be given up, as I was compelled to return in order to attend to the meteorological observation at 3 p. m. A native hunter, whom I immediately sent out, promising him a good reward, likewise failed. They were not seen afterwards.

33. Arenaria interpres (LIN.).

1758.—*Tringa interpres* LIN., Syst. Nat., 10 ed., I, p. 148.—*Strepsilas i.* MIDD., Sibir. Reise, II, 2 (p. 213) (1853).—DYB. & PARVEX, J. f. Orn., 1868, p. 337.—DALL. & BANN., Tr. Chic. Acad., 1869, I (p. 290).—FINSCH, Abh. Brem. Ver., III, 1872, p. 62.—COUES, in Elliott's Aff. Alaska, p. 180 (1873).—TACZAN., J. f. Orn., 1873, p. 101.—*Id., ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 247.—*Id., ibid.*, 1883, p. 339.—*Id.*, Orn. Faun. Vost. Sibir., p. 51 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 219.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 193.—*Id., ibid.*, X, 1882, p. 108.—SEEB., Ibis, 1879, p. 26.—ELLIOTT, Monogr. Seal Isl., p. 129 (1880).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 163.—NELSON, Cruise Corwin, p. 82 (1883).—BLAKIST., Amend. List B. Jap., p. 11 (1884).—*Arenaria i.* TURNER, Auk, 1885, p. 157.

1810.—*Morinella collaris* MEY. & WOLF, Taschb. Deutsch. Vög., I, p. 383.—*Strepsilas c.* KITTL., Denkw., I, p. 287; II, p. 401.—COINDE, Rev. Mag., Zool, 1860, p. 400.

1826.—*Tringa oahuensis* BLOXH., Voy. Blonde, App. (p. 251).

1826.—*Charadrius cinclus* PALL., Zoogr. Ross. As., II, p. 148.

I have carefully compared my specimens with others from the Pacific and find them to agree in all essential points with birds from the Atlantic. Those from the latter in the collection of the National Museum are a trifle brighter colored, a circumstance due to the less worn state of their plumage. No foundation for even a subspecific division could be detected. *Arenaria melanocephala* is a good species.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*
89047	1081	Bering Island	May 25, 1882.	♂ ad.	234	152	62
92767	1420	do	Aug. 12, 1882.	♂ ad.	223	149	60
92768	2084	do	May 29, 1883.	(♂) ad.	(221)	152	63

No. 89047.—Iris brown. Bill brownish black. Feet intense vermilion, without the slightest trace of orange; joints and naked part of tibia dark brown; nails black; under side of toes orange.

No. 92767.—Iris dark brown. Bill blackish olive-gray, a narrow space at base of lower mandible reddish flesh-color. Feet orange red, joints dusky.

The natives call the Turnstone "*Krasnonogoj Kulik*," *i. e.*, red-legged Sand-snipe, and their Aleutian name of it is "*Kidmalgikh*." It makes its appearance early in May (in 1883 the first ones were observed on the 7th), and the beach, especially on the north shore of Bering Island, fairly swarms with them. In June they disappear, and only a few remain during the summer. These, I suppose, to breed, although I did not succeed in finding any of their nests. However, as early as the latter part of July, even larger flocks than those seen in spring, return from the north. From this time and until late in autumn enormous masses of them may be seen on the killing grounds, near the seal rookeries, where thousands of putrified carcasses of the slain fur-seals swarm with myriads of the white larvæ of the flesh-fly, upon which the pretty turn stones feed and grow exceedingly fat. At sunset they retire to the beach, where they pass the night, not, however, without having performed a soldier-like drill by flying up and down the endless tundra, now in full body, now again in detached divisions, and with admirable precision turning and maneuvering as if obeying the command of a leading officer.

34. Charadrius squatarola (LIN.).

1758.—*Tringa squatarola* LIN., Syst. Nat., 10 ed., I, p. 149.—*Charadrius sq.* MIDD., Sibir. Reise, II, 2 (p. 290) (1853).

1766.—*Tringa helvetica* LIN., Syst. Nat., 12 ed., I, p. 250.—*Squatarola h.* KITTL., Denkw., II, p. 401 (1858).—CASSIN, Pr. Ac. Phil., 1858, p. 195.—SCHRENCK, Reis. Amurl., I, p. 409 (1860).—SWINH., Ibis, 1860, p. 63.—*Id., ibid.*, 1861, pp. 51, 342.—*Id., ibid.*, 1863, p. 404.—*Id., ibid.*, 1870, p. 360.—*Id.. ibid.*, 1875, p. 452.—*Id.*, P. Z. S. 1863, p. 309.—*Id., ibid.*, 1871, p. 403.—RADDE, Reis. Süd. Ost-Sibir., II (p. 322) (1863).—DYB. & PARVEX, J. f. Orn. 1868, p. 337.—PRZEW., Putesch. Ussur. (n. 151) (1870).—TACZAN., J. f. Orn., 1873,

1826.—*Charadrius mongolicus* PALL., Zoogr. Ross. Ass., II, p. 136.—MIDD., Sibir. Reise, II, 2 (p. 211, taf. xix, figs. 2, 3).—SCHRENCK, Reis. Amurl., p. 411 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 324) (1863).—PRZEW., Putesch. Ussur. (n. 153), (1870) —FINSCH, Verh. Zool. Bot. Ges. Wien, 1873, extr., p. 18.—*Ægialites m.* SWINH., P. Z. S., 1863, p. 310.—*Id., ibid.*, 1870, p. 140.—*Id., ibid.*, 1871, p. 404.—*Id.*, Ibis, 1870, p. 360.—HARTING, Ibis, 1870, p. 384.—*Id.*, P. Z. S., 1871, p. 110.—PELZ., Verh. Zool. Bot. Ver. Wien, 1873, extr., p. 6.—SEEB., Ibis, 1879, p. 25.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 192.—*Id., ibid.*, X, 1882, p. 108.—NELSON, Cruise Corwin, p. 85 (1883).—BLAKIST., Amend. List B. Jap., p. 10 (1884).—*Eudromias m.* TACZAN., Bull. Soc. Zool. France, 1876, p. 248.—*Id., ibid.*, 1882, p. 397.—*Id., ibid.*, 1882, p. 397.—*Id.*, Orn. Faun. Vost. Sibir., p. 52 (1877).—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.—*Id.*, Naturen, 1884, p. 51.—BOGDAN., Consp. Av. Ross., I, p. 73 (1884).

1878.—*Ægialitis ruficapilla?* BLAKIST. & PRYER, Ibis, 1878, p. 219 (*nec* TEMM.).—SEEB., Ibis, 1879, p. 25.

DESCRIPTION.—♂ ad. *Breeding plumage* (U. S. N. M., No. 89051; L. Stejneger, No. 1041. Bering Island, May 11, 1882).

Forehead white, divided by a black line which, commencing from the culmen, borders the white frontlet above, then descends in front of the eye, uniting with the broad black loral stripe, which extends backwards under the eye, and occupies the ear-coverts; from the hind part of these a very narrow blackish line descends on the lower neck, uniting with the corresponding line from the other side, encircling the white chin and throat which, thus, on all sides are bordered with blackish; fore part of crown and a stripe over the eyes, behind communicating with the neck-ring, pale rufous; hind part of crown and nape brownish gray separated from the same color of the back by a rather narrow ring of a bright cinnamon rufous, which widens anteriorly so as to embrace the whole jugium and fore breast; shoulders and back brownish gray, with a just perceptible silky gloss of olive, fading into a lighter shade on the rump; wing-coverts and tertials of the same color; flanks brownish gray, with broad white edgings, remaining under plumage white, except tibiæ which are strongly tinged with rufous. Primaries blackish brown, fading into brownish gray on the inner ones, from the seventh with a mesial white spot in the outer web; shaft of the first primary white, those of the others only mesially so; large coverts, with white tips, forming a cross-bar. Tail-feathers dark brownish gray, this color fading gradually on the lateral ones; the outermost on each side white, with a wedge-shaped gray spot in the inner web near the tip; tips of all the rectrices, except the middle pair, edged with white.

For colors of naked parts and for dimensions, see "list of specimens collected."

A few of the white feathers of the forehead are slightly tipped with black. It seems as if the whole forehead had been black, the black edgings of the feathers having been worn away. This would account for the great variation of the extent of the white and black of the forehead in these birds, and such an assumption is supported by the fact that a specimen from Japan killed in April has almost the whole forehead black, while this color is still more reduced in specimens killed later than that described above. It is at least quite certain that the black forehead does not indicate the full summer plumage. The two other males of my collection differ from the above only in being a little less brightly

colored; the eye-stripe decidedly paler, and the rufous breast-band narrower, showing, besides, only a faint trace of the black line separating the band from the white of the throat.

♀ ad. *Breeding plumage* (U. S. N. M., No. 89052; L. Stejneger, No. 1042. Bering Island, May 11, 1882).

Differs from the male in having the rufous parts much paler. The black markings on the forehead are almost absent, and under the eyes and on the ear-coverts replaced by blackish.

Other females of the collection show the markings on the head quite distinct, but of a dark brownish gray, and not black color. The collar is also much narrower.

The young bird in first plumage,

(No. 89050), resembles somewhat the adults. The brownish gray of the back is paler, and each feather narrowly edged with isabella color, with which also the lower parts are suffused; on the pectoral region a buffish tinge replaces the rufous collar, and the black markings are absent from the head, the cheeks and ear-coverts being slightly dusky; forehead between bill and eyes whitish, suffused with isabella color.

No. 92781 has only partly assumed the feathers. These are essentially as in the specimen just described, but the isabella-colored edgings are broad and the isabella suffusion stronger. Head and neck still downy, whitish, on forehead and cheeks suffused with isabella color; the latter parts with some blackish markings; crown of the head dark brownish gray, mottled finely with isabella color.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond tail.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm.
89051	1041	Bering Island	May 11, 1882	♂ ad.	190	.....	130	53
89053	1052	.....do	May 15, 1882	♂ ad.	201	.....	131	56
92778	2078	.....do	May 14, 1882	(♂) ad.	(187)	.....	127	52
89052	1042	.....do	May 11, 1882	♀ ad.	190	.....	132	53
89054	1053	.....do	May 15, 1882	♀ ad.	192	.....	.....	.....
89055	1061	.... do	May 19, 1882	♀ ad.	206	.....	133	57
89137	1214	Copper Island	June 19, 1882	♀ ad.	182	.....	130	53
92780	2123	Bering Island	June 4, 1883	♀ ad.	201	5	128	50
92779	2218	Copper Island	July 2, 1883	♀ ad.	191	6	128	50
89050	1656	Bering Island	Sept. 22, 1882	♂ jun.	224	.....	121	51
89049	1651	.....do	Sept. 22, 1882	♀ jun.	183	.....	.....	.....
92781	2242	Copper Island	July 13, 1883	pull.	125	.....	67	.....

No. 89053.—Iris dark brown. Bill black. Feet somewhat bluish gray, toes darker.

No. 89054.—Feet faint yellowish gray, toes darker.

No. 80137.—Feet gray with a tinge of brownish, toes more blackish.

No. 92780.—Iris dark hazel. Bill black. Feet dark gray with an olive tinge; toes darker, blackish. Shot on the nest. Very fat. A large naked "brood-patch" on each side of the abdomen communicating behind.

No. 92779.—Feet gray, with a purplish-olive tinge; toes, especially the joints, darker, nearly blackish. Molting; new feathers protruding on crown and nape.

No. 89049.—Iris dark brown. Bill, angle of mouth, and ring round the eyes black. Legs clear gray; tarsus tinged with yellowish, toes with blackish, and soles with reddish.

No. 92781.—Iris dark hazel. Bill olive-black. Feet gray, with a tinge of yellowish olive; toes darker.

The Mongolian Plover is a very common summer resident on the Commander Islands, in fact, one of the most characteristic birds of their fauna.

It is one of the brightest and handsomest shore birds, and is always gladly welcomed when making its appearance during the first half of May. I used then to watch with delight these elegant runners, wondering at the almost incredible rapidity with which they move their legs when chasing each other over the pebbly beach, or trying to escape the approaching hunter. Very soon, however, the pairs retire to the place chosen for the summer home, and, as soon as the eggs are laid, the birds become more shy, and do not expose themselves as much as they did before. They do not fly directly from the nest either, but run away a distance from it before taking wing. It is therefore exceedingly difficult to find the nest, and I do not wonder that none of the Russian travelers have procured the nest and eggs. I myself only succeeded in finding a few nests with eggs, to be described further on. The eggs were found during the first days of June and young ones about the middle of July. About this time the families retire from the beach and are now met with in the interior, where they ascend the mountains in search of tender insects. I frequently met them at an altitude of 1,000 feet or more above sea level. About the middle of September the families return to the lowlands and to the beach, soon afterwards leaving the islands.

The call-note is a clear, penetrating "drrrriit!"

While at Glinka, on Copper Island, in July, 1883, a young bird of this species, not yet fully feathered (the same one described above), was brought to me alive. Allowed to run free on the floor it immediately commenced a very animated pursuit of the rather numerous flies, which were caught with remarkable precision and rapidity and devoured with an unsatiable appetite. The little fellow did not pay any attention to the presence of several persons in the small room, but when the dog

rose from his nap in the corner, the swift-footed fly-killer suddenly dropped flat on the floor, with withdrawn neck, making himself as small and flat as possible, and remained thus perfectly immovable until the dog turned his head the other way, when he ran off to the darkest corner of the room, where he remained until the former laid down in his old place. Then he started the fly-hunting again; the dog rose once more, and the same performance was repeated. Within half an hour, however, he had learned that the dog did not take any notice of him whatever, and consequently he afterwards paid as little attention to the dog as to man.

The nest, spoken of above, was found on the islet Toporkof, on the 4th of June, 1883, and contained three eggs. They were lying, with their pointed end inwards and downwards, in a slight hollow in the ground between the stems of four *Angelica archangelica*. Dry particles of the leaves and stems of this plant, and numerous seeds of the same, formed the nest, being evidently brought together by the bird itself. The situation of the nest was about 40 feet from the line of high water, and about 14 feet above the level of the sea.

One of the eggs was quite clear; the second contained a small embryo in which only the large eyes were distinguishable; the third had a larger fœtus, with well-developed wings, legs, &c.

In general appearance the eggs recall those of *Ægialitis semipalmata*, being larger, however, and of a somewhat deeper ground color, in two eggs of set No. 21772 more olive, in the others more buff. The spots are, on the whole, smaller than, in average, specimens of the former, being in that respect more like *Æ. hiaticula*. They, consequently, are more unlike eggs of *Eudromias morinellus* than those of typical *Ægialites*.

Dimensions of the eggs.

U. S. Nat. Mus. No.	L. Stejneger No.	Locality.	Date.	Diameters.
				Millimeters.
21771	1377	Sevornoje, Bering Island	July —, 1882	36.5 by 27
21770	1156	Village, Bering Island	June 4, 1882	36 by 26.5
				37 by 27
				36 by 27.25
21772	2124	Toporkoff, Bering Island	June 4, 1882	37.25 by 27
				36 by 27
				37 by 27

Family SCOLOPACIDÆ.

37. Gallinago gallinago (LIN.).

1758.—*Scolopax gallinago* LIN., Syst. Nat., 10 ed., I, p. 147.—PALL., Zoogr. Ross. As., p. 174 (1826).—TEMM. & SCHLEG., Faun. Jap. Aves (p. 112) (1849).—MIDDEND., Sibir., Reise, II, 2 (p. 224) (1853).—SCHRENCK, Reis. Amurl., I, 426 (1860).—RADDE, Reis. Süd. Ost-Sibir., II, (p. 337) (1863).—DYBOW. PARVEX, J. f. Orn., 1868, p. 338.—PRZEW., Putesch., Ussur. (n. 174) (1870).—*Gallinago g.* LICHT., Nomencl. Mus. Ber., p. 93 (1854).

1801.—*Scolopax coelestis* FRENZEL, Beschr. Vög. Wittenb. (p. 58).

1816.—*Gallinago media* LEACH, Syst. Cat. M. B. Br., Mus. p. 31 (*nec* BOCK, 1779).—SWINH., Ibis, 1866, p. 294.—WHITELY, Ibis, 1867, p. 200.

1837.—*Gallinago uniclavus* HOGS., J. As. Soc. Beng., VI (p. 492).—SWINH., Ibis, 1860, p 65.—*Id.*, *ibid.*, 1861, pp. 56, 343.—*Id.*, *ibid.*, 1862, p. 259.—TACZAN., J. f. Orn. 1874, p. 325.—*Id.*, *ibid.*, 1875, p. 255.—*Id.*, Bull. Soc. Zool. France, 1876, p. 257.—*Id.*, *ibid.*, 1883, p. 340.—*Id.*, Orn., Faun. Vost. Sibir., p. 59 (1877).

1838.—*Gallinago scolopacinus* BONAP., Comp. List., p. 52.—SWINH., Ibis, 1863, p. 415.—*Id.*, *ibid.*, 1865, p. 347.—*Id.*, *ibid.*, 1867, p. 234.—*Id.*, *ibid.*, 1870, p. 362.—*Id.*, *ibid.*, 1874, p. 163.—*Id.*, P. Z. S., 1863, p. 314.—FINSCH, Verh. Zool. Botan. Ver. Wien, 1872, p. 266.—TACZAN., J. f. Orn., 1873, p. 106.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 257.—*Id.*, Orn. Fauna East. Sibir., p. 59 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 222.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 197.—*Iid.*, *ibpt.*, X, 1882, p. 114.—SEEB., Ibis, 1879, p. 27.—BLAKIST., Amend. List B. Jap., p. 12 (1884.)

1856.—*Gallinago japonica* BONAP., Compt. Rend., XLIII (p. 579).

1856.—*Gallinago burka* BONAP., Compt. Rend., XLIII (p. 579).—SWINH., P. Z. S., 1863, p. 314.—*Id.*, Ibis, 1865, p. 231.

? 1857.—*Gallinago stenura* CASSIN in Perry's Exped. Jap. II, p. 227 (*nec* TEMM.).

1883.—*Gallinago grallinaria*? STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 69.

The specimens collected by me have been carefully compared with a good series of typical *G. gallinago* from Europe, several skins from Japan and India, and a large series of *G. wilsonii* from North America, including Alaskan specimens. The result has been that the Bering Island birds, as also the Japanese, most decidedly belong to the European species, both in regard to number of tail-feathers, white lining of the wing, less heavy black cross-bars on the axillaries, less pronounced cross-bars on the outermost tail-feathers, and the greater breadth of the latter. In the birds from the Old World the outermost rectrices are almost twice as broad as those of *G. wilsonii*, a character which seems to me to be the most reliable one for distinguishing the two forms. The average length of the bill is greater in *gallinago*, but I have before me specimens of *G. wilsonii* in which the bill is considerably longer than in some from the Old World. Nevertheless the two forms are entitled to full specific rank.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92782	2153	Bering Island.....	June 9, 1883	♂ ad.	269	12	124	58	67	33	35
89072	1467	....do	Aug. 15, 1882	♂ ad.	270	.....	130	57	70	32	36
89073	1522	....do	Sept. 6, 1882	♂ jun.	268	.....	127	58	63	32	35
89071	1407	... do	Aug. 6, 1882	♀ ad.	255	.....	123	57	66	30	35
89074	1631	... do	Sept. 10, 1882	♀	268	.....	122	56	64	31	34
89075	1653	... do	Sept. 21, 1882	♀ jun.	264	.....	121	59	65	33	36

No. 92782.—Bill brownish gray, blackish at tip. Feet gray, strongly tinged with yellowish olive. Not fat.

No. 89072.—Iris dark brown. Bill blackish brown at tip, olive gray at base, lower mandible more yellowish. Feet light olive gray, more bluish on the joints, more yellowish in front of tarsus and toes.

No. 89071.—In the crop remains of a *Lumbricus*, and in the stomach stones and remains of a *Helix* shell.

The common Snipe is tolerably common on Bering Island, and breeds in all suitable places, low swampy tundras, both on the extensive northern low lands and in the broader valleys of the southern part. In 1883 they were not observed before the 10th of May, but were at that time exceptionally numerous, being evidently migrating and prevented from landing in Kamtschatka on account of the enormous amount of snow covering the whole country down to the water's edge at that time.

The "bleating" sound of the Bering Island Snipe is identical with that of the European bird, being surprisingly like the bleating of a goat. On clear sunny days, between 10 and 12 o'clock in the forenoon, in the early part of the summer, this bleating could be heard almost anywhere in the swamps surrounding the village, so I had splendid opportunities for observing the birds during their singular performances. Very often the Snipe would rise so high in the air as to become almost invisible to the unaided eye, but still the strange sound rang vigorously down to the observer. Not only this power of the sound, but even more so the nature of the tune itself convinced me that it originates from the throat and not in any way either from the tail or the wing-feathers, as suggested by many European writers. It is true that the wings are in a state of very rapid vibration during the oblique descent when the note is uttered, but this circumstance does not testify only in favor of the theory of the sound being produced by the wing, as the vibration most conclusively accounts for the quivering throat-sound. Anybody stretch-

ing his arms out as if flying, and moving them rapidly up and down and simultaneously uttering any sound is bound to "bleat." Having heard, however, from my early days, of the wing or tail theories as the only orthodox ones, I did not feel convinced of the correctness of my own opinion until one evening I heard another bird of the same family produce a very similar note *while sitting on the ground*. Referring to the observation recorded under *Arquatella couesi*, I here only remark that the sound was so similar as to leave no doubt whatever in my mind that it had a similar origin in both cases.* It may be that a Snipe has never been observed bleating on the ground, but the fact that a so nearly allied bird is capable of producing essentially the same sound while in that position is an argument in favor of the more natural explanation of the sound originating from the organ which in almost all other instances is adapted to that purpose.

38. Arquatella couesi RIDGW.

1826.—*Trynga arquatella* var. PALL., Zoogr. Ross.-As., II, p. 190.

1869.—*Tringa maritima* DALL & BANN., Tr. Chic. Acad., I, 1869 (p. 291) (*nec* BRÜNN).—BAIRD, *ibid.* (p. 717).—HARTING, P. Z. S., 1871, p. 116.—FINSCH, Abh. Brem. Ver., III, p. 65 (1872).—DALL, Avif. Aleut. Isl. Unal. eastw., p. 4 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 6 (1874).—PALMÉN, Swed. Cat. Lond. Fish. Exh., p. 203 (1883).

1880.—*Arquatella couesi* RIDGW., Bull. Nütt. Orn. Cl., 1880, p. 160.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 164.—NELSON, Cruise Corwin, p. 85, cfr. p. 56 e (1883).

1883.—*Arquatella* sp. STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 69.

1884.—*Tringa crassirostris* BOGDAN., Consp. Av. Ross., I, p. 88 (*nec* TEMM. & SCHLEG.)

The Aleutian Sandpiper is a perfectly good and distinct species, readily distinguished in all plumages from *Arquatella maritima*, with which it until a late date usually has been confounded. Having nothing to add to the excellent exposition given by Robert Ridgway in the Nuttall Bulletin for 1880 (p. 160), of the characters of this and allied species I only refer to that very important paper. It may, however, be well to emphasize that this species takes the place of *Arquatella maritima* BRÜNN. in the Pacific, and that *A. maritima* is not found on this side at all. All earlier references to that species as occurring in Bering Sea or adjacent waters properly belong either to *couesi* or *ptilocnemis*.

Arquatella ptilocnemis COUES, from the Prybilof Islands, does not winter on the Commander Islands, as conjectured by Mr. W. H. Elliott (Monogr. Seal Islands, p. 129), nor does it visit them during the migra-

* I would not be surprised if the "drumming" sound of *Bonasa umbellus* is capable of a similar explanation, but having had no opportunities of observing the bird myself I offer this remark only as a hint for ornithologists with better facilities.

tion. Dr. G. Hartlaub, in a very important contribution to the Alaskan Avifauna (Beitrag zur Ornithologie von Alaska, Journ. f. Ornith., 1883, p. 279), shows that *A. ptilocnemis* winters along the northwestern coast of North America. He reports one specimen having been procured by Messrs. Krause at Portage Bay on the 27th of December, and two females on January 27. The travelers remark that the species was not seen in large flocks before the end of April, and that it was absent during the summer.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
89033	1031	Bering Island	May 10, 1882	♂ ad.	198	.....	.....	.....	.....	.....	.....
89035	1039	....do	May 11, 1882	♂ ad.	196	.....	118	57	27	24	27
92703	1085	....do	May 24, 1882	♂ ad.	.....	.....	.....	.....	.....	.....	.....
89181	1107	....do	May 29, 1882	♂ ad.	191	.....	117	57	26	23	26
89043	1408	....do	Aug. 15, 1882	♂ ad.	215	.....	120	58	29	25	28
89044	1657	....do	Sept. 22, 1882	♂ ad.	204	.....	.....	.....	.....	.....	.....
89045	1658	....do	Sept. 22, 1882	♂ ad.	208	.....	121	58	26	24	28
92785	1695	....do	Oct. 24, 1882	♂ ad.	204	.....	118	58	25	23	27
92787	2001	....do	Apr. 4, 1883	♂ ad.	203	.....	118	56	25	23	27
92786	2004	....do	Apr. 28, 1883	♂ ad.	209	9	123	57	26	23	26
89038	1048	....do	May 14, 1882	♀ ad.	212	.....	121	58	29	23	27
89182	1108	....do	May 29, 1882	♀ ad.	207	.....	123	58	30	24	27
89034	1137	....do	May 29, 1882	♀ ad.	211	.....	123	58	28	24	28
89037	1345	....do	Aug. 1, 1882	♀ ad.	209	.....	118	55	27	25	28
92788	1655	....do	Sept. 22, 1882	♀ ad.	214	.....	123	59	29	23	29
92784	1694	....do	Oct. 24, 1882	♀	218	.....	.....	.....	.....	.....	.....
89036	1044	....do	May. 13, 1882	♀ ad.	206	.....	118	57	29	23	28
89042	1410	....do	Aug. 6, 1882	.....	205	.....	121	60	27	25	28
89039	1263	....do	July 17, 1882	jun.	.....	.....	110	44	24	24	28
89040	1344	....do	Aug. 1, 1882	pull.	117	.....	.....	.....	15	22	25
92790	2178	....do	June 17, 1882	pull.	97	.....	.....	.....	11	21	26
92789	2241	Copper Island	July 13, 1883	pull.	132	.....	62	.....	17	23	26

No. 89035.—Bill blackish gray with an olive tinge, yellowish olive gray towards the base. Feet, yellowish olive gray; toes darker.

No. 89181.—Iris dark brown.

No. 92785.—Bill olive blackish towards tip, yellowish towards base. Feet olive yellow, joints darker olive.

No. 92786.—Bill olive blackish at tip, yellowish at base. Feet dull olive yellow, joints darker olive gray. Tip of tail reached middle of basal phalange of middle toe, legs being stretched backwards, while tip of wings reached the tarsal joint. New feathers protruding all over the body. Testes large, swollen. Very fat. In the stomach, remains of a *Lumbricus* and a larva of a beetle.

No. 89037 is the mother of the chick No. 89040.

No. 89040.—Iris dark brown. Bill olive gray, blackish at tip. Feet brownish gray.

No. 92790.—Bill olive black. Feet violet gray.

No. 92789.—Bill blackish brown, lighter and more olive at the base. Feet, gray with a light olive tinge.

The "Lajdinij Kulik," or Beach-Snipe, as it is called by the natives, is one of the few residents of the Commander Islands, which is found there during both summer and winter, and is the only member of the order *Grallæ* wintering on the rough shores of these storm beaten regions. During the whole winter small flocks, consisting of ten to thirty individuals, are to be seen at low water eagerly picking up Gammarids among the stones close to the breakers. In March their ranks are re-enforced by new comers which have wintered on more hospitable shores, and in the latter part of the month enormous flocks of five hundred or more swarm along the beach, especially on the north shore. About one month later the great flocks dissolve into small companies, which, following the water courses, disperse over the whole island, settling in pairs on suitable places at the beaches, on the tundras, or on the mountain plateaus, this bird being in fact one of the most numerous and the most equally distributed species of land birds on the islands. About this time, that is to say, about the middle of April, the brightly-colored summer plumage is assumed, and now commences that poetic time which makes even the dull shore bird sing as spiritedly as any of the true singing birds, *Oscines*, and sweeter than many of them. It was in the late afternoon of the 28th of April, 1883, that I first witnessed this singing performance of the Sandpiper. The bird rose from the *Rhododendron* tundra on the northern slope of Kamennij Valley, and while flying about on quivering wings, sometimes remaining quite still in the air, it uttered a loud, agreeable, and melodious twitter, which really must be called a "song," whereupon, with outstretched wings, it descended obliquely, seating itself upon the top of a tussock. Sitting there, with puffed plumage and pendant wings, it produced a loud "bleating," so much like that of *Gallinago gallinago* as to completely convince me that the analogous note of the latter is produced by the throat in exactly the same manner. During the "bleating" the whole bird was quivering with a tremulous motion as if in a high state of excitement. The voice was slightly more melodious than that of the snipe, but I was not fully convinced of the identity of the bird until it was lying bleeding among the Rhododendrons before me. It was a male, No. 2004 of my collection.

The first eggs are laid about the middle of May. On the 17th of June I got a newly-hatched chick. Like so many other members of the same order, the mother shows great love for her offspring, trying all sorts of devices to divert the attention of the approaching hunter from the young ones to herself, risking her own life in order to save theirs. Once

I caught one of the downy chicks alive. Holding it in my hand I watched the behavior of the distressed mother. At first she feigned lameness, crying piteously, running about with hanging wings, stumbling and rolling over at every second step. As I did not follow her she came nearer and nearer, at last so close that a stroke of a stick saved me a discharge of the gun.

39. Actodromas acuminatus (HORSF.).

1821.—*Totanus acuminatus* HORSFIELD, Tr. Linn. Soc., XIII (p. 192).—*Tringa a.* SWINH., P. Z. S., 1863, p. 316.—*Id., ibid.*, 1871, p. 409.—*Id.*, Ibis, 1863, p. 412.—*Id., ibid*, 1875, p. 455.—TACZAN., J. f. Orn., 1874, pp. 332, 336.—*Id., ibid.*, 1876, p. 201.—*Id.*, Bull. Soc. Zool. France, 1876, p. 252.—*Id., ibid.*, 1882, p. 397.—*Id.*, Orn. Faun. Vost. Sibir., p. 55 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 221.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 195.—*Iid., ibid.*, X. 1882, p. 112.—BLAKIST., Amend. List B. Jap., p. 3 (1884).—BOGDAN., Consp. Av. Ross., I, p. 91 (1884).—*Actodromas a.* RIDGW., Pr. U. S. Nat. Mus., 1880, p. 222.—*Id.*, Nomencl. N. A. B., p. 68 (1881).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 164.—NELSON, Cruise Corwin, p. 86 (1884).

1839.—*Tringa australis* JARD. & SELBY, Illustr. Orn., II (pl. 91)

1853.—*Tringa rufescens* MIDDEND., Sibir. Reise, II, 2 (p. 221) (*nec* VIEILL.).

1863.—*Tringa pectoralis* SWINH., Ibis, 1863, p. 97 (*nec* SAY).

1873.—*Tringa crassirostris* TACZAN., J. f. Orn., 1873, p. 103 (*nec* T. & S.).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.	Middle toe with claw.	Tarsus.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
89029	1646	Bering Island.....	Sept. 19, 1882	♀ jun.	211	.....	127	59	24	26	28
89031	1652	.....do	Sept. 21, 1882	♀ jun.	201	.....	127	54	24	28	30
89032	1659	.....do	Sept. 23, 1882	♀ jun.	200	.....	123	55	23	27	28
92794	1676	.....do	Oct. 7, 1882	♀ jun.	....	.....	135	59	25	29	31
89028	1637	.....do	Sept. 13, 1882	jun.	226	.....	136	59	25	30	32
89030	1641	.....do	Sept. 15, 1882	jun.	210	0	126	56	22	28	30

No. 89029.—Iris dark brown. Bill blackish brown, more brownish, or rather dark reddish gray, at the mouth angle, and somewhat lighter gray at base of lower mandible. Feet ocher-yellow, tinged with olive, and with darker joints.

No. 89028.—Bill blackish brown, lighter towards base, which, especially on the lower mandible, is olive gray. Feet gray, strongly tinged with yellowish olive; joints purer and darker gray. Stomach contained *Gammaridæ*.

No. 89030.—Outstretched legs, with the tip of toes, reached 30^{mm} beyond the tip of tail.

Of this species I only obtained young specimens on Bering Island during the autumnal migration of 1882. From the middle of September and during the following three weeks they were observed both on the tundra near the great lake and on the rocky beach of the ocean searching for Gammarids. They were very shy and mostly single or in small families. Larger flocks were never seen.

40. Actodromas damacensis (HORSF.).

1821.—*Totanus damacensis* HORSF., Tr Linn. Soc., XIII (p. 192), (*nec* TACZANO SKI).—*Tringa d.* SWINH., P. Z. S., 1863, p. 316.—*Id.*, *ibid.*, 1871, p. 409.—*I* Ibis, 1863, p. 413.—*Id.*, *ibid.*, 1875, p. 455.—BLAKIST. & PRYER, Ibis, 18 p. 221.

1853.—*Tringa subminuta* MIDDEND., Sibir-Reise, II (p. 222, tab. xix, fig. 6) SCHRENCK, Reis. Amurl., I, p. 424, (1860).—SWINH., Ibis, 1862, p. 255.—*I ibid.*, 1863, p. 97.—RADDE, Reis. Süd. Ost-Sib., II (p. 333), (1863).—DYBO & PARVEX, J. f. Orn., 1868, p. 337.—TACZAN., J. f. Orn., 1873, p 103.—*I* Bull. Soc. Zool. France, 1876, p. 253.—*Id.*, *ibid.*, 1883, p. 33J.—*Id.*, O Fauna Vost. Sibir., p. 56 (1877).—BLAKIST. & PRYER, Tr. As. Soc. Jap., 1882, p. 112.—BLAKIST., Amend. List B. Jap., p. 37 (1884).—SEEB., It 1884, p. 34.—BOGDAN., Consp. Av. Ross., I, p. 92 (1884).—*Actodromas* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.

1871.—*Tringa salina* DRESSER, B. of Eur., pt. vii, T. min., p. 4 (*nec* PALL.).

1879.—*Tringa ruficollis* SEEBOHM, Ibis, 1879, p. 26 (*nec* PALL.).—BLAKIST. & PR., As. Soc. Jap., VIII, 1880, p. 195.

Having heard of no doubt concerning the identification of Horsefiel *damacensis* with Middendorff's *subminuta*, I adopt it without furth comment.

Dresser is certainly wrong when, in his admirable "History of t Birds of Europe," he identifies Pallas's *salina* with the present speci Not only does the description of the color, "collum a gula ad pect totum ferrugineum," prohibit such an identification, but also the me urements, as the middle toe is only given as $9\frac{1}{8}'''$, that is 0.76 inch. Dresser's *salina* the middle toe is 0.9 inch.

It is difficult to say what Taczanowski's *damacensis* is (Bull. S Zool. France, 1876, p. 253). So much is certain, that it is not the sa as Horsefield's bird, provided the latter be identical with *subminu* MIDD. He gives four distinct species from Eastern Asia, viz, *Trin subminuta*, *salina*, *temminckii*, and *damacensis*. Having had specime of all four, the latter is not likely to be a synonym of any of the foregoi the more so as it seems that he has had all of them both in spring a autumnal plumage (cfr. J. f. Orn., 1873, p. 103). The probability therefore, that his *damacensis* rests upon a specimen of the true weste *minuta*, which also seems to occur in the interior of Asia, without reac ing the borders of the Pacific Ocean, however.* The only difficul arises from his identification of Pallas's *T. cinclus* with *damacen* TACZAN. He says: "Il n'y a aucun doute que la description de Pall s'applique à cette êspèce," while, in my opinion, there cannot be t slightest doubt that Pallas's *cinclus* belongs to *A. temminckii*. Pall describes it as having the wings blackish, "remige *prima rachi alb* and the tail elongated, "*rectricibus lateralibus albis*." These are t

* Cfr. SWINHOE'S statement (P. Z. S., 1871, p. 409), under the head of *salina*, ' have seen the true *T. minuta* in summer plumage, from Lake Baikal." Cfr. al the list of specimens of *minuta* in SAUNDERS'S collection, among which one from Bai by Dr. Dybowski (Dresser *l. c.*).

essential character of *temminckii*, and if Taczanowski's bird agrees with Pallas's description in these points, then certainly it belongs to *temminckii*, and neither to *minuta* nor any of the other three species.

A glance at the dimensions given in the "list of specimens collected" shows at once that the birds from Bering Island are correctly identified as the Long-toed Stint.

Much confusion concerning these small waders has arisen from the fact that most writers have ignored the structural differences by which they are easily and surely kept apart, while they have relied more upon characters of the plumage, so variable in these birds, and so extremely difficult to describe with the necessary precision. A synoptical table of the species occurring on the Asiatic shores of the Pacific Ocean may not be out of place, the more as all belong to the fauna of the Commander Islands.

a^1. Middle toe with claw longer than exposed culmen; tip of outstretched toes reaching far beyond the tip of tail.

b^1. Tail reaching to the end of folded wings, simply graduated; middle toe with claw shorter than tarsus; shafts of all primaries white medially. *A. acuminatus.*

b^2. Tail reaching beyond the tips of folded wings, the four outer pairs of tail-feathers being equal in length, or the outermost even longer than the next ones; middle toe with claw longer than tarsus; shaft of first primary only, white. *A. damacensis.*

a^2. Middle toe with claw equal to exposed culmen; tip of outstretched toes reaches the tip of tail.

b^1. Tail doubly emarginated, the outermost feathers being longer than the next ones; shafts of all primaries white; outer tail-feathers light brownish gray; legs blackish ..... *A. ruficollis.*

b^2. Tail simply graduated, or the outermost tail-feathers at least not longer than the next ones; shaft of first primary only, white; two or three outer tail-feathers on each side white; legs yellowish gray..... *A. temminckii.*

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92797	2102	Bering Island	May 23, 1883	(♂) ad.	(153)	.....	85	39	17	23
92798	2104	..... do	May 23, 1883	(♂) ad.	(143)	.....	85	39	17	25
89021	1103	.....do	May 29, 1882	♀ ad.	153	.....	92	40	18	25
89022	1104	.....do	May 29, 1882	ad.	152	.....	87	39	18	25
89024	1415	.....do	Aug. 7, 1882	ad.	158	11	88	40	19	24

No. 89021.—Iris dark brown. Bill blackish; olive-brown at base of lower jaw. Feet grayish yellow with joints darker olive.

No. 89024.—Colors as in foregoing specimen. Tip of tail reaches scarcely beyond the tarsal joint of the outstretched legs.

The Long-toed Stint arrives at Bering Island in large flocks during the latter part of May, and are then met with on sandy beaches, where the surf has thrown up large masses of sea-weed, busily engaged in picking up the numerous small crustaceans, &c., with which the weeds abound. Most of the birds stay only a few days, going further north, while a small number remain over summer, breeding sparingly on the large swamp behind the village. My efforts to find the nests were unsuccessful, but I shot birds near Zapornaja Reschka on the 17th and 22d of June, and on the 7th of August.

41. Actodromas ruficollis (PALL.).

1776.—*Tringa ruficollis* PALL., Reis. Russ. Reichs, III (p. 700).—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 112.—BLAKIST., Amend. List B. Jap., p. 37 (1884).—SEEB., Ibis, 1884, p. 34 (*nec* 1879, *quæ damacensis*).—BOGDAN., Consp. Av. Ross., I, p. 93 (1884).

1823.—*Tringa albescens* TEMM., Pl. Color., V, livr. vii, pl. 41, fig. 2.—SWINH., P. Z. S., 1863, p. 316.—*Id.*, Ibis, 1863, p. 413.—*Id.*, *ibid.*, 1870, p. 363.—*Id.*, *ibid.*, 1875, p. 455.—BLAKIST. & PRYER. Ibis, 1878, p. 221.—*Ibid.*, Tr. As. Soc. Jap., VIII, 1880, p. 195.

1826.—*Trynga salina* PALL., Zoogr. Ross. As., II, p. 199 (*nec* DRESSER, 1871, *quæ damacensis*).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 337.—TACZAN., J. f. Orn., 1873, p. 103.—*Id.*, Bull. Soc. Zool. France, 1876, p. 253.—*Id.*, *ibid.*, 1883, p. 340.—*Id.*, Orn. Faun. Vost. Sibir., p. 56 (1877).

1853.—*Tringa minuta* MIDD., Sibir. Reise, II, 2 (p. 221, *part*).—SCHRENCK, Reise Amurl., I, p. 423 (1860).—SWINH., Ibis, 1860, pp. 342, 358 (*nec* LEISL.).—*Id.*, *ibid.*, 1862, p. 255.—WHITELY, Ibis, 1867, p. 206.

1862.—*Tringa temminckii* BLAKIST., Ibis, 1862, p. 330 (*nec* LEISL.).

1883.—*Actodromas damacensis* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71 (*nec* HORSF.).

Specimens from Japan, China, and Senjavin Straits have been at hand for comparison.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Middle toe with claw.	Expos. culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92795	2115	Bering Island.....	June 3, 1883	♂ ad.	158	0	97	44	18	1
89025	1099	.....do	May 29, 1882	♀ ad.	151	.....	99	45	19	1
89170	1100	.....do	May 29, 1882	♀ ad.	151	.....	100	45	19	1
89171	1101	.....do	May 29, 1882	♀ ad.	152	.....	102	45	19	1
89172	1102	.....do	May 29, 1882	♀ ad.	165	.....	105	47	18.5	1
92796	2569	.....do	Sept. 9, 1883	jun.	.....	.....	96	43	18	1

No. 92795.—Iris dark brown. Bill olive-black, as are also the feet. Very fat. Testes large, swollen.
No. 89025.—Bill black. Legs grayish black.
No. 92796.—Iris dark brown. Feet blackish gray.

This species arrives at Bering Island late in May in rather large flocks, but does not stay long. None were met with during the whole summer, until, in the first half of September, they took a short rest on the shores of our island before continuing their long travel to the southward.

42. Actodromas temminckii (LEISL.).

1787.—*Tringa pusilla* LATHAM, Suppl. Syn. B., I, p. 292 (*nec* LIN.).

1812.—*Tringa temminckii* LEISLER, Nachtr. Bechst. Naturg. Deutschl., II (p. 63).—MIDDEND., Sibir. Reise, II, 2 (p. 221).—(*T. temmingii*) KITTL., Denkw., II, p. 196? (1858).—SCHRENCK, Reis. Amurl., I, p. 442 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 332) (1863).—SWINH., P. Z. S., 1863, p. 317.—*Id., ibid.*, 1871, p. 409.—*Id.*, Ibis, 1860, p. 66.—*Id., ibid.*, 1861, p. 342.—*Id., ibid.*, 1862, p. 255.—*Id., ibid.*, 1863, p. 412.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 337.—TACZAN., J. f. Orn., 1873, p. 103.—*Id., ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 254.—*Id.*, Orn. Fauna Vost. Sibir., p. 57 (1877).—*Actodromus t.* BONAP., Cat. Parzud., p. 15 (1856).—*Actodromas t.* STEJNEGER, Proc. U. S. Nat. Mus., 1883, p. 71.

1836.—*Tringa cinclus* PALL., Zoogr. Ross. As., II, p. 201 (*nec* LIN.).

1882.—*? Tringa damacensis* TACZAN, Bull. Soc. Zool. France, 1882, p. 396 (*nec* HORSF.).

My specimens agree perfectly with examples from Scandinavia and India.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Middle toe with claw.	Expos. culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92798	2094	Bering Island	May 28, 1883	(♂) ad.	(142)	.....	91	46	18	18
92800	2116	.....do	June 3, 1883	♂ ad.	155	5	93	47	17	17
92801	1686	.....do	Oct. 15, 1882	♂ ad.	152	.....	93	46	17	18
89023	1414	.....do	Aug. 9, 1882	jun.	144	.....	94	43	18	17.5

No. 92800.—Iris dark brown. Bill olive black, lighter olive brownish at base, especially on lower mandible. Feet olive yellow, joints more dusky. Fat. Testes very large, 10^{mm} long; swollen.

No. 92801.—Iris dark brown. Bill olive black, lighter below at base. Feet yellowish gray. Tip of outstretched toes reaching the end of the tail; tips of closed wings only the end of the under tail-coverts.

No. 89023.—Iris blackish brown. Bill olive gray at base, blackish at tip. Feet light gray, with a faint tinge of yellow; joints darker gray; nails black. Tip of outstretched toes scarcely reaching the end of tail; tips of closed wings reach the end of tail.

Like the foregoing species, only met with on Bering Isand during the migration seasons; mostly only single individuals either alone or among the flocks of the foregoing two species. A young bird was shot on the tundra August 9, 1882, and it may possibly have been hatched on the island. At all events, Temminck's Stint is a rare bird compared with the two others.

43. Pelidna alpina pacifica (COUES).

1813.—*Tringa alpina* WILSON, Am. Orn., VII (p. 25, pl. 56, f. 2).—BLAKIST., Ibis, 186 p. 330.—SWINH., Ibis, 1866, p. 136, *Id.*, *ibid.*, 1870, p. 363.—WHITELY, Ibi 1867, p. 205.—HARTING., P. Z. S., 1871, p. 115.—*Scolopax a.* PALLAS, Zoog Ross. As., II, p. 176, (*part*).—*Pelidna a.* STEJNEGER, Pr. U. S. Nat. Mus., 188 p. 69.

1849.—*Tringa variabilis* TEMM. & SCHLEG., Faun. Jap. Aves (p. 108).

1858.—*Tringa alpina* var. *americana* CASSIN, Baird's B. N. Amer., p. 719.—*Pelidna a. a* DALL & BANNIST., Tr. Chicago Ac., I, 1869, p. 291.—BEAN. Pr. U. S Nat. Mus., 1882, p. 165.—NELSON, Cruise Corwin, p. 88 (1883).—HARTLAUB J. f. Orn., 1883. p. 280.

1860.—*Tringa cinclus* SCHRENCK, Reis. Amurl., I, p. 121.—SWINH., Ibis, 1860, p. 66.—*Id.*, *ibid.*, 1861, p. 412.—*Id.*, *ibid.*, 1863, pp. 97, 411.—*Id.*, *ibid.*, 1875, p. 455.—*Id.* P. Z. S., 1863, p. 316.—TACZAN., Bull. Soc. Zool. France, 1876, p. 253.—BLA KIST. & PRYER, Ibis, 1878, p. 221.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 195.—*Iid.*, *ibid.*, X, 1882, p. 111.—BLAKIST., Amend. List B. Jap., p. 37 (1884).

1861.—*Tringa subarquata* SWINH., Ibis, 1861, p. 342, (*nec* GÜLD.).

1861.—*Pelidna pacifica* COUES, Pr. Acad. Philada., 1861 (p. 189).

1862.—*Tringa chinensis* SWINH., Ibis, 1862, p. 255 (*nec* GRAY?).

1871.—*Tringa cinclus* var. *chinensis* SWINH , P. Z. S., 1871, p. 408 (*nec* TACZAN. 1873).

1876.—*Tringa damacensis* BLAKIST., Ibis, 1876, p. 334 (*nec* HORSF.).

As I have already remarked in my "Contributions, &c., No. 1" (Pr U. S. Nat. Mus., 1883, p. 69), the specimens of the Dunlin collecte by me on Bering Island are distinguishable from the typical *Pelidn alpina* by its purer colors. Upon a close examination I now find tha my birds agree in every particular with the American form, not onl in size, but also in coloration, the bright rusty of the upper parts pre dominating more and the black of the lower parts being more restricte and of a deeper shade. From all data accessible to me I regard it a certain that all references to a larger form of *Pelidna alpina* or *cinclus* a occurring in the coast regions of Eastern and Northeastern Asia* belon to this form, also including Swinhoe's *chinensis*, with which Taczanow ski's variety of the same name is not identical, being referable to smaller race, afterwards by him given as *Tringa schinzii*. I have bee able to compare large series, and am inclined to think that *Pelidna pac fica* is entitled to full specific rank.

In explanation of the change of name in this form a few remarks ma not be out of place:

In 1822 C. L. Brehm described as *Tringa schinzii* a small race o *Pelidna alpina* L., from Central Europe. Bonaparte, on the othe hand, in 1826, in his "Observations on the Nomenclature of Wilson'

* Birds from Amoy, China, have already been referred to *americana* by Mr. Hartin (*l. c.*), and Dr. BEAN has determined specimens from Plover Bay, Tschutski Peninsula to belong to the same form.

Ornithology," wrongly applied the name given by Brehm to a North American species, the bird called *Actodromas fuscicollis* (VIEILL.) in current lists. He perpetuated his error in his Amer. Ornith. (1833), Compar. List (1838), and Catal. Method. (1842). This bird, which Schlegel in memory of the mistake called *Tringa bonapartei*, is therefore known in synonymies as *Tringa* or *Pelidna schinzii* BONAP. (*nec* BREHM), in contradistinction to the true *P. schinzii* of Europe. Probably being unaware of Schlegel's name, Brehm in 1855 (Naumannia, p. 292) bestowed a new name on the form misnamed by Bonaparte as *schinzii*, calling it *Pelidna americana*, and significantly adding in brackets "Tringa Schinzii *Bp.*" Brehm's *P. americana*, consequently, is only a synonym of *Tringa fuscicollis* VIEILL.

Three years afterwards J. Cassin, in "The Birds of North America," separated the American representative of the European Dunlin as *Tringa alpina* var. *americana* which Coues, in his Monograph of the Tringæ (Proc. Acad. Philada., 1861), raised to specific rank as *Pelidna americana* (CASSIN). From the explanation above it is evident, however, that this appellation is preoccupied, and another name is necessary. Fortunately there is no need of a new one, for Dr. Coues (*l. c.*) indicated *P. pacifica* as a separable form which has not later been recognized. I have myself examined his type (U. S. Nat. Mus., No. 9540), and finding it in every essential a true *P. americana* CASS. (*nec* BREHM), I propose to revive *pacifica* as the name for the Red-backed Sandpiper. *Pelidna alpina pacifica* is also a more fitting name, since it has been shown to inhabit both the Asiatic and the American shores of the Pacific Ocean.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.
89046	1087	Bering Island	May 26, 1882	♂ ad.	208	122	55	36	27	23
89180	1106	do	May 29, 1882	♂ ad.	192	110	50	32	25	22
92791	2100	do	May 28, 1883	(♂) ad.	(193)	114	52	37	27	23
92792	2103	do	May 28, 1883	(♂) ad.	(191)	113	53	36	27	24
89179	1105	do	May 29, 1882	♀ ad.	210	118	53	36	26	23
92793	1090	do	Oct. 22, 1882	♀	201	120	54	36	27	24

No. 89046.—Iris dark brown. Bill and feet olive black.

No. 92793.—Tip of middle claw reached 7mm beyond the tip of tail, legs being stretched backwards, and the latter reached beyond the tips of folded wings for a similar distance.

The Red-backed Sandpiper visits Bering Island only while through during the spring and autumnal migrations. It ar gether with other Sandpipers, in the latter part of May, but stay long.

44. Calidris arenaria (LIN.).

1766.—*Tringa arenaria* LIN., Syst. Nat., 12 ed., I, 251.—MIDDEND., Sibir. Rei 219) (1853).—*Calidris a.* LEACH, Syst. Cat. M. B. Br. Mus., p. 2 KITTL., Denkw., I, p. 254.—SWINH., Ibis, 1860, p. 359.—*Id.*, *ibi* 342.—*Id.*, *ibid.*, 1863, p. 414.—*Id.*, *ibid.*, 1870, p. 363.—*Id.*, *ibid.* 454.—*Id.*, P. Z. S., 1863, p. 315.—*Id.*, *ibid.*, 1871, p. 408.—DYBOW. J. f. Orn., 1868, p. 338.—DALL. & BANNIST., Tr. Chicag., Ac., 292.—PRZEW., Putesch., Ussuri (n. 168) (1870.—TACZAN, Bull. France, 1876, p. 249.—*Id.*, Orn., Fauna Vost. Sibir., p. 52 (1877). Abh. Brem. Ver., III, 1872, p. 65.—BLAKIST. & PRYER, Ibis 221.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 196.—*Iid.*, *ibid.*, X, 188 NELSON, Cruise Corwin, p. 88 (1882.)—BLAKIST., Amend. List B. J (1884).

1766.—*Charadrius calidris* LIN., Syst. Nat., 12 ed., I p. 255.—*Trynga c.* PAI Ross. As., II, p. 202 (1826).

1826.—*Trynga tridactyla* PALL., Zoogr. Ross. As., II, p. 198.

Rare during the migrating season. A single male was shot small flock on Bering Island September 19, 1882. Iris dark Bill and feet olive black. Total length, 186^{mm}; wing, 111^{mm}; tail- 49^{mm}; expos. culmen, 24^{mm}; tarsus, 24^{mm}; middle toe with cla

45. Limosa lapponica baueri (NAUM.).

1826.—*Limosa barge* PALL., Zoogr. Ross. As., II, p. 180 (*part*).

1834.—*Limosa bauri* NAUM., Vög. Deutschl., VIII, p. 429.—PELZ., Wiener ber., 1860, XLI, p. 326.

1844.—*Limosa lapponica* var. *novæ zelandiæ* GRAY, Voy. Ereb. and Terr., B NELSON, Cruise Corwin, p. 89.

1844.—*Limosa australasiana* GRAY, Grallæ Brit. Mus. (p. 95).

1847.—*Limosa novæ-zelandiæ* GRAY, Gen. B., III, p. 570.

1848.—*Limosa forii* PEALE, U. S. Expl. Exp. B. (p. 231).

1848.—*Limosa uropygialis* GOULD, P. Z. S., 1848, p. 38.—SWINH., Ibis, 1863 *Id.*, *ibid.*, 1870, p. 362.—*Id.*, *ibid.*, 1875, p. 453.—*Id.*, P. Z. S., 1863 *Id.*, *ibid.*, 1871, p. 406.—BAIRD, Tr. Chicag. Acad., I, 1869 (p 320 DALL & BANN., *ibid.*, p. 293.—FINSCH, Abh. Brem. Ver., III, 187 DALL, Avif. Aleut. Isl. Unal. eastw., p. 4 (1873).—*Id.*, Avif. Aleut Unal., p. 6 (1874).—TACZAN., Bull. Soc. Zool. France, 1876, p. *ibid.*, 1883, p. 340.—*Id.*, Orn. Faun. Vost. Sibir., p. 1 (1877).—E PRYER, Ibis, 1878, p. 220.—*L. uropigialis Iid.*, Tr. As. Soc. Jap., V p. 194.—HARTL., J. f. Orn, 1883, p. 279.—PALMÉN, Swed. Cat. L Exh., p. 203 (1883).—BOGDAN., Consp. Av. Ross., I, p. 87 (1884).

1849.—*Limosa rufa* TEMM. & SCHL., Faun. Jap. Av. (p. 114).—BOGDAN., Ross., I, p. 86 (1884).

1858.—*Limosa lapponica* CASSIN, Pr. Acad. Philada., 1858, p. 196.—SWINH., p. 409.—*Id.*, *ibid.*, 1863, p. 97.—*Id.*, *ibid.*, 1867, p. 388.—BLAKIST. Tr. As. Soc. Jap., X, 1882, p. 110.—BLAKIST., Amend. List B. (1884).

1861.—*Gallinago punctata* ELLMAN, Zoologist, 1861 (p. 7470).

I see no reason for lumping the eastern and western forms of this species together, as they are fairly separable by the darker rump and heavier-barred flanks and axillaries of the former. As a rule *baueri* is paler than the typical *lapponica*, but a specimen from Bering Island, No. 92818, is fully as deeply colored as average European specimens, being, however, the darkest of an extensive series.

The name given by Naumann is undoubtedly older than those given by Gray or Gould. It is not a museum name only, as Naumann, when publishing it, indicated a character by which he thought it separable. That this character afterwards failed, does not invalidate the name; hence there is no good reason for rejecting it.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wings beyond tail.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
89064	1158	Bering Island	June 4, 1882	♂ ad.	388	.....	214	79	80	55	33
89065	1179	... do....	June 8, 1882	♂ ad.	388	.....	222	81	81	55	37
89066	1180	....do.....	June 8, 1882	♂ ad.	390	.....	222	76	89	54	35
92818	2085	....do.....	May 21, 1883	(♂) ad.	(376)	.....	222	78	78	53	34
92817	2167	....do.....	June 12, 1883	♂ ad.	372	17	213	79	78	55	34
92816	2796	... do.....	Sept. —, 1883	.....	.....	.....	213	74	86	56	36

No. 89064.—Iris dark brown. Bill blackish brown at tip, light reddish gray at base, especially light on both rami of the lower mandible. Feet uniform brownish black.

No. 89065.—Basal half of bill flesh-color, terminal half blackish brown.

No. 92817.—Bill blackish brown, brownish flesh-color at base below.

The Pacific Bar-tailed Godwit is a regular visitor to the Commander Islands during the migratory seasons. In 1883 I observed the first ones on the 10th of May on the sandy beach at Fedoskija, Bering Island, and specimens were obtained again during the latter part of September. While on Copper Island, in 1883, I saw one solitary bird at Glinka, about the middle of July, and another at Pestschanij on the 30th of the same month, so that it may be that a few remain to breed. It is, however, not uncommon among Arctic waters that individuals, not disposed to breed, stay at some more southerly locality during the whole summer.

Genus PSEUDOTOTANUS HUME.

Syn. =1878.—*Pseudototanus* HUME, Stray Feath., VI (p. 488).
=1884.—*Pseudoglottis* STEJNEGER, Zeitschr. Ges. Orn., I, 1884, p. 223.

Bill rather stout, long, longer than tarsus, culmen slightly recurved;

groove on the upper mandible only reaching the middle of the bill; lower mandible with a well-pronounced gonydeal angle. Malar apex reaching forward beyond the loral apex; mental apex reaching beyond the middle of the nostrils.

Feet not very long, moderately strong; tarsus longer than middle toe with claw, scutellate in front and behind; naked part of tibiæ about the length of the two basal articles of the middle toe, scutellate at the upper end, reticulate nearer to the titio-tarsal joint; outer and middle toes united by a large basal web, middle and inner ones by a smaller membrane, as large, however, as the usual web in Totanine birds between the outer and middle toes; border of the toes distinctly serrated.

Wings pointed, normally totanine; first primary longest.

Tail of normal length, square.

This genus, which originally was established by Hume, afterwards receiving by me the name *Pseudoglottis*, on account of the superficial resemblance of the type species to the type of Nilson's subgenus *Glottis*, belongs to a group of the Totanine waders characterized by the semipalmated toes, and takes a position somewhat intermediate between the genera *Terekia* and *Symphemia*. The basal webs are fully as well developed as in any of these recognized genera.

Though distinct from both these genera it seems perhaps somewhat nearer related to *Symphemia* than to *Terekia*, notwithstanding the fact that up to the present date the type species has been given as a synonym of the type of the latter genus.

The three genera may be easily recognized by the following

SYNOPSIS.

a¹. Bill extremely long, longer than tarsus plus the two basal articles of the middle toe; naked portion of tibiæ reticulate in front; feathering on the mental angle not reaching as far forward as the feathering of the forehead or the hind border of the nostrils; groove on the upper mandible long, reaching almost to the tip ..... *Terekia.*

a². Bill never longer than tarsus plus the first basal article of the middle toe; naked portion of tibiæ scutellate in front above; feathering on the mental angle reaching far in front of the feathering of the forehead and beyond the middle of the nostrils; groove on upper mandible does not reach beyond the middle the bill.

b¹. Culmen recurved, longer than tarsus ..... *Pseudototanus.*

b². Culmen straight, shorter than tarsus ..... *Symphemia.*

46. Pseudototanus guttifer (NORDM.).

1835.—*Totanus guttifer* NORDMANN in Erman's Verzeichn. Thier. Pflanz, Reis. Erde, p. 17.

1854.—*Xenus guttifer* LICHTENSTEIN, Nomencl. Mus. Berol., p. 91.

1856.—*Terekia guttifera* BONAPARTE, Compt. Rend., XLIII, p. 597.
1876.—*Totanus haughtoni* ARMSTRONG, Stray Feath., IV (p. 344).—HARTING, Ibis, 1883, p. 133, pl. iv.
1878.—*Pseudototanus haughtoni* HUME, Stray Feath., VI (p. 488).—*Id.*, Game B., India, III (p. 403), (1880).
1884.—*Pseudototanus guttifer* STEJNEGER, Zeitschr. Ges. Orn., I, 1884, p. 223, pl. x.

A new specific name was prepared for this bird besides the new generic term, as I had not been able to find any description which would fit. Nor could I in any list detect any recognized species which it could possibly be. Swinhoe's lists of Chinese birds, Blakiston's of those from Japan, and Taczanowski's papers on the avifauna of Eastern Siberia did not contain any name with which it could be identified. Even Gray's "Hand list" and Schlegel's "Scolopaces, Mus. P. B." failed. Thinking it rather improbable, however, that so conspicuous a form should have escaped detection, as it, by no means, could be regarded as a form of restricted local occurrence, I, as a last refuge, went through all the synonyms of Totanine birds given in the "Hand list." In going through the synonymy of *Terekia cinerea* I was struck by the suggestive name *guttifera* NORDM.

A specimen of *Terekia cinerea* was then lying on the table before me, but a glance at its dark uropygium, the gray neck slightly streaked with dusky, its whole coloration and small size as compared with the white rump and lower back, rounded black spots on the breast, the blackish mottled coloration of the upper parts and the much superior size of my bird, which is nearly as large as *Totanus nebularius* (= *glottis* BEHST.), made the idea of a confusion of these two species appear so absurd that I proceeded further on through the list. As I did not succeed in finding what I looked for, I once more returned to *Terekia cinerea* and its synonym *guttifera*. The latter name seemed to me so inappropriate to the Terek Sandpiper that I sent to the library for Erman's "Naturhistorischer Atlas," although I did it more in order to convince myself than with the hope of finding the original description of my bird.

Nevertheless, v. Nordmann's description proved to belong to it. It was my good luck to revive this very distinct form (so distinct that it constitutes the type of a new genus) after having been forgotten almost completely for forty nine years.

As already indicated, its resemblance to *Terekia* is so slight that no further comparison is needed. In general style it somewhat resembles *Totanus nebularius* (*glottis* BECHST.), and if specimens have been col-

lected since Erman's time they have, in all probability, been confounded with the latter species. A closer comparison will soon show how different they are.

(1) In *T. nebularius* only the outer toe is united with the middle one by a membrane; in *Ps. guttifera* both the outer and the inner toes are united with the middle one by large webs.

(2) In *T. nebularius* the tarsus is longer than the exposed culmen, while in *guttifera* the tarsus is much shorter than the culmen.

(3) In *T. nebularius* the naked part of the tibia is equal to the middle toe without claw; in *Ps. guttifera* it is much shorter, scarcely exceeding the two basal joints of the middle toe.

It will thus be seen that *T. nebularius* stands much higher on its legs than *Ps. guttifera*.

(4) In *T. nebularius* the bill is much more slender; the gonys without any distinct angle; malar apex of the feathering on the lower mandible does not extend in front of the loral apex of the feathering on the maxilla. *Ps. guttifera* has a much stouter bill, broader and higher at the base; at the beginning of the symphysis the gonys forms a distinct angle; the malar apex extends in front of the loral apex.

(5) In *T. nebularius* the under wing-coverts are gray or white, barred or edged with dusky, while in *Ps. guttifera* all the under wing-coverts are pure white.

(6) In *T. nebularius* the tail-feathers are white, except the two middle ones, which are gray, and all more and less transversely banded or mottled with dusky, except the lateral ones, which are nearly uniform white. In *Ps. guttifera* all the tail-feathers are light gray, with a narrow submarginal border of a somewhat darker gray, but without any transverse spots or bars.

(7) In *T. nebularius* the fore neck and throat are finely streaked with small lanceolate blackish stripes, and the breast white, unspotted. In *Ps. guttifera* the fore neck and throat are similarly but less densely streaked, while the breast is dotted with large rounded black spots.

Besides these there are many other differences. *T. nebularius* is considerably larger, the white of the lower part of the back reaches much higher up on the back, the coloration of the dark parts of the upper surface is different, &c., but the differences pointed out above will be sufficient to convince the most skeptical that the two species are distinct, and will enable anybody to separate them with the greatest ease.

A comparison of the original description of v. Nordmann* with that of my bird given below will prove the correctness of my identification.

Description. ♂ *ad.*—*U. S. Nat. Mus. No.* 92808, *L. Stejneger No.* 2088. *Bering Island May* 22, 1883.

Upper parts of the body, except the rump, blackish brown more and less edged with whitish, as the white edges are differently worn away; thus the crown is almost uniform brownish black with a few white streaks; the neck is more uniformly and finely streaked longitudinally, while on the back the light edges become broader backward; in many feathers on the latter part the whitish edges have the inner border waved or indented, the outline of the feathers by abrasion being correspondingly scalloped. Among the dark feathers, and mostly concealed by these, are left a number of uniform sandy gray feathers, the remainder of the winter plumage. The other parts of the body are white; the rump and the middle of abdomen unspotted; sides of the head and neck, forehead, and superciliaries heavily streaked with blackish, most densely on the lores; chin with a few faint roundish spots, throat and fore neck strongly marked with terminal, somewhat lanceolate, streaks; on the jugulum and the breast the spots become subterminal, broadening so as to form rather large rounded drops with a somewhat flattened basal border; on the anterior half of the flanks the spots are still broader, almost assuming the character of cross-bars. Primaries blackish brown, from the seventh lighter, brownish ash, as are also the secondaries, and with white edges, which gradually become broader on the interior web of the secondaries the nearer they are to the body; white edges on the tertials with indented borders and the feathers scalloped; primary coverts with only a very narrow white terminal edge, the other upper wing-coverts with rather broad white edges, shafts of the primaries brown, mesially lighter; that of the first one wholly white; all under wing-coverts uniform pure white. Tail light ashy gray, whitish at the base, and indistinctly mottled with darker gray along the edges which are whitish; the mottlings hardly visible on the middle pair; shafts of rectrices white, even those of the middle pair; upper tail-coverts white, submarginally marked with dusky; under tail-coverts white with two or three small and irregularly placed dark spots or streaks.

Total length, 287^{mm}; wing, 173^{mm}; tail-feathers, 67^{mm}; exposed culmen, 53^{mm}; tarsus, 43^{mm}; middle toe with claw, 35^{mm}.†

A single specimen was shot on Bering Island on the 22d of May, 1883, during my absence in Kamstchatka. It was prepared by my faithful Nicanor, one of the natives, whom we usually styled "the professor." At the same time, two days later, I myself shot another specimen on the

---

*As this description may be difficult for many ornithologists to consult, a reproduction is herewith given:

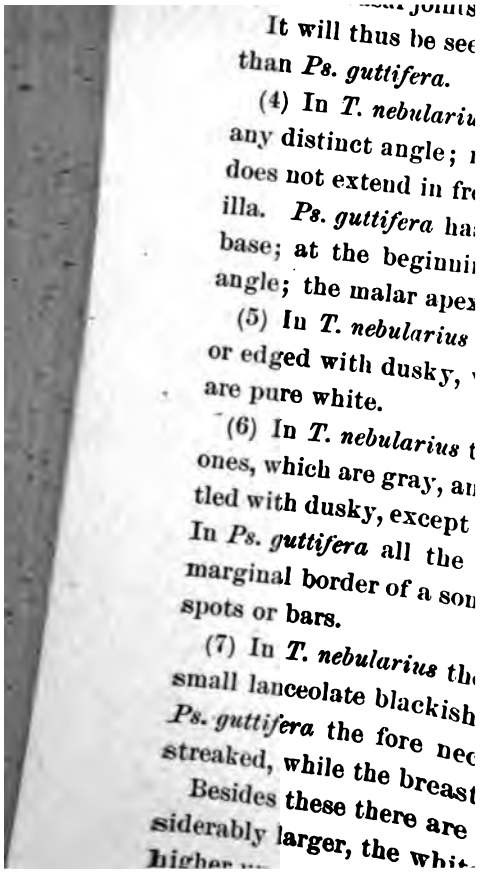
124. *Totanus guttifer. Nov. spec. Supra fuscogriseus, sparsim albido-maculatus; collo pectoreque albis, nigro-guttatis; cauda alba, obsolete griseo-signata.*

Ausmessung: Länge 12″, Länge des Schnabels vom Mundwinkel beinahe 2″, Höhe des Schnabels an der Wurzel 3‴, Länge der Flügel 6″ 3‴, Länge des Schwanzes 2″ 3‴, Höhe der Ferse 1″ 9‴, Länge der Mittelzehe 1″, Länge der Hinterzehe beinahe 3‴.

Am nächsten mit *Tot. glottis* verwandt, doch ist unser Vogel kleiner, der Schnabel stärker, zur Spitze nach oben gebogen die Schwimmhaut zwischen den Zehen und die Füsse bedeutend kürzer. Oberkörper grau, mit sparsamen weisslichen Flecken. Auf dem Kopf und Nacken strichförmige, auf der weissen Kehle, dem Vorderhals und der Brust grosse schwarze, tropfenartige Flecken; Schnabel schwarz. Unterkörper beinahe einfarbig weiss, die spitzen über den Schwanz hinausreichenden Schwingen schwärzlich; mittlere Schwanzfedern mit grösseren schwärzlichen Abzeichen.

Das vorliegende Exemplar dieser sehr ausgezeichneten Art wurde in der Umgegend von Ochozk im Monat Juli von *Erman* erlegt. In der Sammlung der Akademie der Wissenschaften zu St Petersburg befinden sich zwei Individuen, welche wahrscheinlich aus derselben Gegend sind. (Nordmann, in Erman's Verz. Thier. Pflanz. Reise um die Erde, p. 17.)

†This measurement disagrees greatly with that given by Nordmann, 1 inch, this latter being probably only a misprint.



joints

It will thus be see
than *Ps. guttifera.*

(4) In *T. nebulariu*
any distinct angle; t
does not extend in fr
illa. *Ps. guttifera* ha
base; at the beginni
angle; the malar apex

(5) In *T. nebularius*
or edged with dusky,
are pure white.

(6) In *T. nebularius* t
ones, which are gray, a
tled with dusky, except
In *Ps. guttifera* all the
marginal border of a so
spots or bars.

(7) In *T. nebularius* th
small lanceolate blackish
Ps. guttifera the fore nec
streaked, while the breast

Besides these there are
siderably larger, the whi
higher ...

The Greenshank occurs regularly on Bering Island during the spring migration, but does not breed there as far as I know of.

I also found them rather numerous on the delta of Avatscha River, Kamtschatka, in the latter part of May, 1883.

48. Totanus ater (SANDER).

1766.—*Scolopax fusca* LIN., Syst. Nat., 12 ed., I, p. 243 (*nec* 1758, quæ *Guara alba*.).—*Limosa f.* PALL., Zoogr. Ross. As., II, p. 187.—*Totanus f.* MIDDEND., Sibir. Reis., II, 2 (p. 214) (1853).—SWINH., Ibis, 1862, p. 254.—*Id.*, *ibid.*, 1863, p. 97.—*Id.*, *ibid.*, 1875, p. 453.—*Id.*, P. Z. S., 1862, p. 319.—*Id.*, *ibid.*, 1863, p. 311.—*Id.*, *ibid.*, 1870, p. 427.—*Id.*, *ibid.*, 1871, p. 406.—RADDE, Reis. Süd. Ost-Sibir., II (p. 327) (1863).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 337.—PRZEW., Putesch. Ussur. (n. 160) (1870).—TACZAN., J. f. Orn., 1873, p. 102.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 250.—*Id.*, *ibid.*, 1883, p. 339.—*Id.*, Orn. Faun. Vost. Sibir., p. 54 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 220.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 193.—*Iid.*, *ibid.*, X, 1882, p. 110.—BLAKIST., Amend. List B. Jap., p. 11 (1884).—BOGDAN., Consp. Av. Ross., I, p. 96 (1884).

1779.—*Scolopax atra* SANDER, Naturforsch., XIII (p. 193).

In the tenth edition Linnæus described the young of *Guara alba* as *Scolopax fusca*, basing it upon Catesby's "Nat. Hist. Carolin., plate 83." In the twelfth edition he applied the identical name, *Scolopax fusca*, to quite a different bird, the European Dusky Sandpiper, usually known as *Totanus fuscus*. It therefore has become necessary, according to the A. O. U. rules, to adopt the name next in date, which, fortunately, is a very appropriate one.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm*	*mm.*	*mm*
92810	2085	Bering Island	May 20, 1883	(♂) ad.	(303)	156	49	54	53	35
92812	2089	.....do	May 20, 1883	(♀) ad.	(329)	162	68	61	58	40
92811	2087	.....do	May 20, 1883	(♀) ad.	(304)	159	69	56	55	37

During my absence from Bering Island in the spring of 1883 three specimens in summer plumage were shot and prepared. The species may be regarded as a rather rare visitor, as it was not known to any of the residents on the islands. Like so many other rare migrating visitors to Bering Island in the spring of 1883, its appearance probably was due to the abnormal amount of snow in Kamtschatka at that time.

49. Totanus glareola (LIN.).

1758.—*Tringa glareola* LIN., Syst. Nat., 10 ed., I, p. 149 (*nec* PALL., 1826).—*Totanus* TEMM., Man. d'Orn., 1 ed. (p. 421) (1815).—TEMM. & SCHL., Faun. Ja Av. (p. 110) (1849).—MIDDEND., Sibir. Reis., II, 2 (p. 215) (1853).- SCHRENCK, Reis. Amurl., I, p. 416.—SWINH., Ibis, 1860, p. 66.—*Id.*, *ibid.*, 186 p. 343.—*Id.*, *ibid.*, 1863, p. 407 (1860).—*Id.*, *ibid*, 1870. p. 363.—*Id.*, *ibid*, 187 p, 458.—*Id.*, P. Z. S., 1863, p. 311.—*Id.*, *ibid.*, 1871, p. 406.—RADDE., Rei Süd. Ost-Sibir., II (p. 324) (1863).—WHITELY, Ibis, 1867, p. 205.—DYBOW. PARVEX, J. f. Orn., 1868, p. 337.—PRZEW., Putesch. Ussur. (n. 162).—TACZAN J. f. Orn., 1873, p. 102.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zoo France, 1876, p. 251.—*Id.*, *ibid.*, 1823, p. 339.—*Id.*, Orn. Faun. Vost. Sibi p. 54 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 220.—*Id.*, Tr. As. Soc. Ja VIII, 1880, p. 194.—*Id.*, *ibid.*, X, 1882, p. 110.—STEJNEGER, Pr. U. S. Na Mus., 1883, p. 71.—BLAKIST., Amend. List B. Jap., p. 36 (1884).

1822.—*Totanus affinis* HORSF., Tr. Linn. Soc., XVIII (p. 191).—SWINH., P. Z. S., 186 p. 311.—*Id.*, Ibis, 1866, p. 294.

1866.—*Trynga littorea* PALL., Zoogr. Ross. Asiat., II, p. 195.

The specimens collected by me have been compared with a fair seri of birds from China, India, and Europe, and found to be identical.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond tail.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm*	*mm.*	*mm*
89082	1182	Bering Island.....	June 6, 1882	♂ ad.	214	.....	122	53	26	37	
92802	2602	.....do.....	May 23, 1883	(♂) ad.	(215)	.....	120	53	28	37	

[redacted]

50. Actitis hypoleucos (LIN.).

1758.—*Tringa hypoleucos* LIN., Syst. Nat., 10 ed., I, p. 149.—*Actitis h.* BOIE, Isis, 1822, p. 560.—MIDDEND., Sibir. Reise, II, 2 (p. 215) (1853).—SCHRENCK, Reis. Amurl., I, p. 417 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 320) (1863).—SCHLEG., Mus.P. B. Grallæ, p. 80 (1865).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 337.—PRZEW., Putesch. Üssur. (n. 163).—TACZAN., J. f. Orn., 1873, p. 102.—*Id., ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 250.—*Id., ibid.*, 1883, p. 339.—*Id.*, Orn. Faun. Vost. Sibir., p. 53 (1877).—*Tringoides h.* SWINH., Ibis, 1860, p. 66.—*Id., ibid.*, 1861, p. 343.—*Id., ibid.*, 1862, p. 259.—*Id., Ibid.*, 1863, p. 408.—*Id., ibid.*, 1870, p. 363.—*Id., ibid.*, 1874, p. 163.—*Id., Ibid.*, 1875, p. 453.—*Id.*, P. Z. S., 1863, p. 312.—*Id., ibid.*, 1871, p. 406.—BLAKIST. & PRYER, Ibis, 1878, p. 220.—*Iid.*, Tr. As. Soc., Jap., VIII, 1880, p. 194.—*Iid., ibid.*, X, 1882, p. 110.—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.—BLAKIST., Amend. List B. Jap., p. 36 (1884).

1826.—*Tringa leucoptera* PALL., Zoogr. Ross. As., II, p. 196.

It is true that Illiger united in his genus *Actitis* both *Limosa*, *Totanus*, *Tringa*, *Pavoncella*, and the bird of the present genus, but there is no more reason for dropping his name altogether than for disregarding Linnæus's *Tringa*, and there are no more reasons for quoting "*Actitis* BOIE *nec* ILLIGER" than for "*Tringa* BAIRD *nec* LIN." Illiger (Prod. p. 262) enumerates as species of his genus *Actitis*: "Scolopax Limosa, Totanus, Tringa pugnax, Hypoleucos *Lin.*" Of these the two first had already, by earlier writers, been separated as types of *Limosa* and *Totanus*, leaving in 1811 *Tringa pugnax* and *hypoleucos* the occupants of the restricted genus *Actitis*. In 1816, LEACH established the genus *Pavoncella* for the former of these two species, so that *hypoleucos*, by elimination, has become the only type of *Actitis* ILLIG., to the exclusion of *Tringoides* BONAP., 1831,* which is a pure synonym of *Actitis*.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
82041	1553	Bering Island.....	Sept. 9, 1882	♂	203	.....	104	53	25	25	23
82305	2091	.....do.....	May 22, 1883	(♂) ad.	(187)	.....	103	54	25	25	24
82304	2101	.....do.....	May 24, 1883	(♂) ad.	(188)	.....	104	57	24	24	23

No. 82041.—Iris dark brown. Bill dark brownish gray, blackish toward tip, reddish at base of lower mandible. Feet light gray with a faint tinge of yellowish green.

* Saggio Distr. Meth. Anim. Vertebr., p. 58.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

in color, distinguishable in all plumages, adults and young, summer and winter specimens.

The reason why Cassin failed to maintain the distinction between the two species was partly that he overlooked the structural differences, partly that he mistook the adult barred summer plumage for that of the young, while it is the young plumage which he regarded as the breeding dress.

If the ornithologists interested in this question will place before them their specimens, or series of specimens, I would propose to them to measure the length of the nasal groove from the loral apex of the feathering to the foremost end of the furrow. Specimens in which the groove is as long as about two-thirds of the length of the exposed culmen from the feathering, belong to *Heteracïtis incanus;* specimens in which this groove is only half as long as the exposed culmen are true *H. brevipes.* If the collection is large enough we will find, when dividing it into two series, according to the above character, that each of these contain specimens, some of which are distinctly barred underneath, partially or wholly, others being only more or less uniformly clouded with gray on fore neck, throat, and flanks. If now comparing the barred specimens of both series, we will find the following differences in color: In those with the long nasal groove, *incanus*, the whole under surface, including middle of abdomen and under tail-coverts, is distinctly and uniformly barred with blackish gray, and the back is purer gray; in the specimens with the short groove the middle of the abdomen and the under tail-coverts are pure white, the dark bars on the other part being lighter and finer, while the back is more tinged with brownish. Upon taking measurements we will find that the long-grooved, heavy-barred *incanus* average larger than the short-grooved, lighter *brevipes.*

If we now compare the two series of unbarred specimens we will find that the long-grooved ones are purer gray and average larger (*incanus*) than the short-grooved ones, which are appreciably browner and smaller.

Anybody taking the trouble of still closer examining his specimens will soon find additional characters, and will especially appreciate the distinct and regular white bars—two or more on each feather—on the upper tail-coverts of the unabraded plumage, in *brevipes*, in contradistinction to those in *incanus*, in which these feathers are either uniform gray or with a very narrow light edging.

These facts ought now to convince the most skeptical of the validity of the two species. To those who have got no material, or only an insufficient series, I would say that the above process was the one followed by me in handling my series, and that the characters are persistent and without the slightest sign of intergradation throughout the whole lot of more than twenty specimens, while the table of dimensions below conclusively prove the points above alluded to.

It is a matter of regret to me that so many of the labels of the unbarred birds in my series have no definite data as to the exact time of their capture. Nevertheless I think it pretty clearly established by the facts accessible to me, that the barred plumage is the full adult breeding plumage, while the clouded under side represents the young bird of the year, and possibly the adults during the four months from December to March. It is furthermore clear from an inspection of the specimens that there is no sexual difference either in color or dimensions. No. 87243, collected on the Fiji Islands in "winter," shows some new feathers with bars, and v. Pelzeln (Novara Exp., p. 130) mentions a specimen from Tahiti, shot on the 25th of February, which most probably is a true *incanus* in transition to the barred plumage.*

Turning to the question of the geographical distribution of the two species we already, at the outset, feel the mischief done by the untimely "lumping," as in many cases where no description is given, it is impossible to tell which bird more recent authors have had before them.

It may, however, be stated at once that *H. brevipes*, the short-groove

Savai (Hartlaub, Finsch); Fiji (Peale, Walden). This is probably also the species occurring on the Hawaiian Islands. It may also be remarked that a bird recorded by Finsch and Hartlaub from the Pelew Islands seems to belong here.

The true *brevipes*, on the other hand, is a more Asiatic species, to which is referable all or most of the records from Kamtschatka, Japan, Okotsk, Baikal, Bonin Islands, Liu-Kiu Islands, Formosa, China, Philippine Islands, probably also the Marianne and the Caroline Islands,* from Borneo, Timur, Ceram, and Australia.

Comparative table of dimensions.

I.—HETERACTITIS INCANUS.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex.	Wing.	Tail-feathers.	Expos. culmen.	Length of nasal groove.	Tarsus.	Middle toe with claw.
						mm.	mm.	mm.	mm.	mm.	mm.
82430*	Belding..	.....	Cerros Island, Cal...	Apr. —, 1881	♀	170	73	37	27	33	31
*	Cooper ..	71	Shoalwater Bay, W. T.	May 9, 1854	♀	166	74	39	26	34	31
73441*	Nelson ..	3	Sannak Isl., Alaska.	May 15, 1877	♀	173	77	38	26	35	31
54602*	Dall	1649	Nulato, Alaska	May 27, 1868	♂	167	73	38	25	34	31
93813*	Stejneger	2066	Bering Island.....	May 29, 1883	(♂)	161	77	39	26	33	31
93814*	.. do	2067	....do.....	May 29, 1883	(♂)	165	73	37	24	33	31
89077*	... do	1140	....do.....	June 1, 1882	....	164	74	35	22	34	32
89078*	....do	1141	... do.....	June 1, 1883	♂	172	78	39	25	34	31
64272*	Elliott ...	.....	St. George I., Alaska.	July 29, 1873	....	172	77	38	25	33	31
87244*	Goward..	.....	Fiji Islands	Summer.....	....	177	77	39	24	35	31
15724	Peale †...	.....	....do	.....	♂	180	79	42	28	35	32
8646*	Bendire..	54	Fort Klamath, Oreg.	Aug. 25, 1882	♀	163	70	36	24	34	29
82815*	Stejneger	1647	Bering Island	Sept. 20, 1882	♂	161	68	37	24	32	30
67321*	Streets ..	12	Palmyra Island	(Dec.)	....	161	72	38	26	34	31
87243*	Goward..	.....	Fiji Islands.....	Winter.....	....	165	80	32	24	34	31
*	Nelson..	1292	Alaska	.....	....	170	80	38	25	35	32
75831*	....do ...	475	....do.....	....	♂	168	78	36	23	34	31
21437*	Gruber ..	21432	Farallones, California.	.....	....	166	80	38	24	34	30
	Average measurements of eighteen specimens					168	76	38	25	34	31

* Cf. Finsch's statement about the birds collected by him on the Eastern Carolines, the Marshall, and Gilbert Islands: "Die Verfärbungsverhältnisse sind sehr auffallend, da Exemplare Mitte Juni noch keine Spur eines Sommerkleides zeigen." (Vög. d. Südsee, p. 56 (1884)). Of course, the summer plumage which Finsch expected to see is that of *incanus*, while the specimens in question belong to *brevipes*!

Comparative table of dimensions—Continued.

II.—HETERACTITIS BREVIPES.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex.	Wing.	Tail-feathers.	Expos. culmen.	Length of nasal groove.	Tarsus.
						mm.	mm.	mm.	mm.	mm.
15819§	Heine	51	Hakodadi	May —, 1854	..	160	69	34	16	35
89076§	Stejneger	1089	Bering Island	May 28, 1882	♂	160	69	37	18	33
67301§	Bernstein	10271	Halmaheira	Nov. —, 1861	♂	165	67	39	19	33
91400‡	Jouy	783	Matsumoto, Japan	Nov. 15, 1882	♀	154	69	35	17	34
21226‡	Rogers	γ177	Bonin Islands		....	164	66	36	19	33
	Average measurements of five specimens‖					161	68	36	18	34

*Specimens with the whole under surface, including under tail-coverts uniformly barred with gray.
†Type of *Totanus polynesiæ* PEALE.
‡Specimens without bars underneath.
§Specimens barred on fore neck, throat, and flanks.
‖For additional specimens received after the table was prepared, see under the following specie

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.
					mm.	mm.	mm.	mm.	mm.
89077	1140	Bering Island	June 1. 1882	.....	267	164	74	35	34
89078	1141	.....do	June 1, 1882	♂ ad.	286	172	78	39	34
92813	2066	.....do	May 27, 1883	(♂) ad.	(270)	161	77	39	33
92814	2067	.....do	May 29, 1883	(♂) ad.	(268)	165	73	37	33
92815	1647	.....do	Sept. 20, 1882	♂ jun.	256	161	68	37	32

No. 89077.—Iris dark brown. Bill brownish black, lighter brownish gray at base of lower mand Feet ocher yellow, with a faint greenish tinge on the joints.

No. 92815.—Iris dark brown. Bill olive gray, blackish at tip. Feet yellow, with a faint gre tinge; nails black.

The Wandering Tattler, the "Tschornij Kulik" of the Russi comes to the islands during the latter part of May, and may then met with on the stony beaches close to the water's edge, in pairs o very small troops. At the time of their arrival they are less shy t totanine birds generally, but their conduct changes after awhile that I only once, on Copper Island, in the middle of July, observe single specimen during the summer, although I feel suspicious t they breed there.

This bird makes quite a different impression on the observer from the other totanine waders, and its habits seem to be rather peculiar, in many respects reminding one of the Oyster-catcher. It carries its body much in the same manner as *Actitis hypoleucos*, but very seldom flirts its tail up and down like the latter, nor has it as much of the peculiar movement of the head and neck as the common sandpiper. It is a much more quiet bird, very often standing immovable for a long while staring down into the water. Its flight is graceful and very rapid. Its voice loud and harsh, almost screaming. I only met it among rocks and stones, seldom, if ever, on the sandy or gravelly beaches.

53. Heteractitis brevipes (VIEILL.).

1817.—*Totanus brevipes* VIEILL., N. Dict. d'Hist. Nat., VI, p. 410.—CASSIN, Exp. Jap. Perry, II, p. 229 (1857).—*Id.*, U. S. Expl. Exp., p. 339 (1858).—*Id.*, Pr. Acad. Philada., 1858, p. 195.—*Id.*, *ibid.*, 1862, p. 321.—SWINH, Ibis, 1863, p. 407.—*Id.*, *ibid.*, 1867, p. 390.—*Id.*, P. Z. S., 1863, p. 312.

1826.—*Trynga glareola* PALL., Zoogr. Ross. As., II, p. 194, pl. lx (*nec* LIN.).

1831.—*Totanus pedestris* LESSON, Tr. d'Orn., p. 552 (*part*).

1844.—*Totanus pulverulentus* MÜLL., Naturk. Verhandl. (p. 152).—TEMM. & SCHLEG., Faun. Jap. Av., p. 109, pl. 65 (1849).—MIDDEND., Sibir. Reis., II, 2 (p. 214) (1853).—SWINH., Ibis, 1860, pp. 132, 259.—*Id.*, *ibid.*, 1861, p. 343.—*Id.*, *ibid.*, 1862, p. 254.—RADDE, Reis. Süd. Ost-Sibir., II (p. 326) (1863).—WHITELY, Ibis, 1867, p. 205.—*Actitis p.* DYBOW. & PARVEX, J. f. Orn., 1868, p. 337.—TACZAN., J. f. Orn., 1873, p. 102.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1876, p. 250.—*Id.*, *ibid.*, 1882, p. 397.—*Id.*, Orn. Faun. Vost. Sibir., p. 54 (1877).

1848.—*Totanus griseopygius* GOULD, P. Z. S., 1848, p. 39.

1871.—*Totanus incanus* SWINH., P. Z. S., 1871, p. 406 (*nec* GMEL.).—*Id.*, Ibis, 1874, p. 163.—*Id.*, *ibid.*, 1875, p 453.—BLAKIST. & PRYER, Ibis, 1878, p. 220.—*Id.*, *ibid.*, Tr. As. Soc. Jap., VIII, 1880, p. 192.—*Id.*, *ibid.*, X, 1882, p. 109.—BLAKIST., Amend. List B. Jap., p. 11 (1884).—*Heteroscelus incanus* BOGDAN., Consp. Av. Ross., I, p. 98 (1884).

The distinctive characters which separate this species from the foregoing have been pointed out under the head of the latter.

The specimen obtained by me on Bering Island agrees in every particular with specimens from Japan and Halmaheira, while those of *incanus* as closely agree with the examples from America and Polynesia.

The dimensions of the specimen collected are as follows:

♂ ad. *U. S. Nat. Mus.*, *No.* 89076, *L. Stejneger*, *No.* 1089; *Bering Island*, *May* 28, 1882. Total length, 265^{mm}; wing, 160^{mm}; tail-feathers, 69^{mm}; exposed culmen, 37^{mm}; tarsus, 33^{mm}; middle toe with claw, 30^{mm}.

Remarks.—Iris dark brown. Bill blackish gray, light brownish gray at base of lower mandible. Feet light ocher yellow, joints with a faint greenish tinge.

Only one specimen of this bird was obtained, although I was full aware of the difference between the two forms, and consequently on tl lookout for both.

I afterwards received from Kamtschatka three young birds co lected in the fall of 1884. The characters pointed out at once disti guishes them from *incanus*.

Measurements.

U. S. Nat. Mus. No.	Sex and age.	Locality.	Date.	Wing.	Tail.	Culmen.	Tarsus.	Middle toe.
				mm.	mm.	mm.	mm.	m
101661	jun.	Petropaulski, Kamtschatka	1884	161	67	38	34	
101662	jun.	do	1884	164	66	38	32	
101663	jun.	do	1884	155	64	37	33	

54. Numenius phæopus variegatus (SCOP.).

1786.—*Tantalus variegatus* SCOPOLI, Delic. F. Fl. Insubr., II, p. 92 (*ed.* NEWT).—*N menius* v. SEEB., Ibis, 1884, p. 34.—BLAKIST., Amend. List B. Jap., p. 39 (188

1788.—*Scolopax luzoniensis* GMEL., Syst. Nat., I, p. 656.—*Numenius l.* SWINH., P. Z. S 1871, p. 410.

1817.—*Numenius atricapillus* VIEILL., N. Dict. d'Hist. Nat., VIII, p. 303.

1826.—*Numenius phæopus* PALL., Zoogr. Ross. As., II, p. 169 (*part*).—SCHLEG., Mus. B. Grall., p. 93 (*part*).—SWINH., Ibis, 1877, p. 146.—BLAKIST. & PRYER, Ib 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 198.—*Id.*, *ibid.*, X, 18 p. 116.

1840.—*Numenius uropygialis* GOULD, P. Z. S., 1840, p. 175.—SWINH., Ibis, 1863, p. 409. *Id.*, *ibid.*, 1866, p. 137.—BOGDAN., Consp. Av. Ross., I, p. 84 (1884).

1856.—*Numenius tahitiensis* CASSIN, Exped. Jap. Perry, II, p. 228 (*nec* GMEL.).—SWIN P. Z. S., 1863, p. 318.

1883.—*Numenius melanorhynchus* TACZAN., Bull. Soc. Zool. France, 1883, p. 340 (*nec* B 1856, qui ex Grœnlandia).

The two specimens which I secured at Bering Island I have careful compared with specimens of typical *phæopus* from Europe, and wi numerous specimens of the eastern representative from China a Japan, and also with a specimen in the National Museum, obtained fro Mr. Harting, and determined by him as *N. luzoniensis*. The characte of the dark and strongly streaked rump and the barred under ta coverts are well developed, and were it not that the occurrence of *n merous* intermediate specimens have been recorded, I should consid the two forms good and distinct species.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Chord of exposed culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.
92819	2183	Bering Island.....	June 20, 1883	♀ ad.	439	6	232	95	76	58	40
92820	2190	....do.....	June 21, 1883	♀ ad.	.....	.....	238	99	84	65	41

No. 92819.—Iris dark brown. Bill brownish black, below at base reddish gray. Feet clear bluish gray, joints darker gray. Eggs swollen.

No. 92820.—Colors as foregoing. Eggs large, swollen.

The Eastern Whimbrel is a visitant to the islands during the migrations, in spring and autumn, but, being very wary and their stay short, they are only seldom seen. During the latter part of May, 1882, I observed a flock on the flat sandy borders of the river, behind the village, but the birds disappeared in the fog before I could secure a specimen. During the following spring two females were secured at Emilianovski Mys, on the northern shore, as late as the 20th and 21st of June. They were single, and their eggs large and swollen, so that there is a probability that a few pairs remain during the summer and breed.

In the fall, September 3, 1883, a large flock was observed on the mountain plateau, north of the village, feeding upon the berries of *Empetrum nigrum*. Two young birds were taken on the steamer in the beginning of August, when at sea between Kamtschatka and Bering Island.

55. Phalaropus lobatus (LIN.).

1758.—*Tringa lobata* LIN., Syst. Nat., 10 ed., I, p. 148, cfr. p. 824.—*Phalaropus l.* TURNER, Auk, 1885, p. 157.

1766.—*Tringa hyperborea* LIN., Syst. Nat., 12 ed., I, p. 249.—*Phalaropus h.* DYBOW. & PARVEX, J. f. Orn., 1868, p. 338.—BAIRD, Tr. Chicag. Acad., I, 1869 (p. 706).—TACZAN, Bull. Soc. Zool. France, 1876, p. 251.—*Id.*, Orn Faun. Vost. Sibir., p. 55 (1877).—BLAKIST., Amend. List B. Jap., p. 21 (1884).—*Lobipes h.* DALL & BANNIST., Tr. Chicag. Acad., I., 1869, p. 209.—TACZAN, J. f. Orn., 1873, p. 102.—*Id.*, *ibid.*, 1875, p. 256.—DALL, Avif. Aleut Isl. West. Unal., p. 5 (1874).—SWINH., Ibis, 1875, p. 455.—COUES in Elliott's Aff. Alaska, p. 180 (1875).—BLAKIST. & PRYER, Ibis, 1878, p. 221.—*Id.*, Tr As. Soc. Jap., VIII, 1880, p. 196.—*Id.*, *ibid.*, X, 1882, p. 113.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 166.—ELLIOTT, Monogr. Seal Isl., p. 129, (1882).—NELSON, Cruise Corwin, p. 91 (1883).

1810.—*Phalaropus cinereus* MEY. & WOLF, Taschb. Deutsch. Vögelk., II, p. 417.—MIDDEND., Sibir. Reise, II, 2, p. 215 (1853).—SCHRENCK, Reis. Amurl., I, p. 418 (1860).—FINSCH, Abh. Brem. Ver., III, 1872, p. 65.

1826.—*Phalaropus ruficollis* PALL., Zoogr. Ross. As., II, p. 203.

1826.—*Phalaropus cinerascens* PALL., Zoogr. Ross. As., II, p. 204.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
89177	1097	Bering Island	May 29, 1882	♂ ad.	184	104	52	21	20	21
89178	1098	do	May 29, 1882	♂ ad.	180	103	47	19	20	20
89020	1121	do	May 30, 1882	♂ ad.	177	101	48	21	21	20
89173	1093	do	May 29, 1882	♀ ad.	.....	110	52	20	20	22
89174	1094	do	May 29, 1882	♀ ad.	196	113	53	22	21	20
89175	1095	do	May 29, 1882	♀ ad.	187	109	50	21	21	20
89176	1096	do	May 29, 1882	♀ ad.	194	106	54	20	20	20
89019	1120	do	May 30, 1882	♀ ad.	187	110	51	.....	22	21
92821	1265	do	July 20, 1882	juv.	165	80	35	18	20	20
92822	1266	do	July 17, 1882	pull.	.....	.....	.....	12	19	21

No. 89177.—Iris dark brown. Bill black. Feet grayish blue; joints blackish.

No. 89020.—Iris dark brown. Bill black. Feet grayish blue; outer aspect of tarsus, outer toe, and the joints darker; soles and outer web blackish.

No. 92821.—Iris hazel. Bill blackish. Feet flesh-color; outer aspect and joints dark grayish. A few downy feathers still on the neck.

No. 92822.—Like the foregoing.

The Red-necked Phalarope is one of the commonest breeding summer birds on Bering Island.

In 1882 they arrived in large numbers on the 29th of May, and during the following week all the smaller ponds on the tundras all over the northern part of the island were crowded. In 1883 the new-comers

ORDER CHENOMORPHÆ.

Superfamily ANATOIDEÆ.

Family ANATIDÆ.

57. Anser segetum middendorffi (SEVERZ.).

1853.—*Anser grandis* MIDDEND., Sibir. Reise., II, 2 (p. 225, tb. xx, fig. 1) (*nec* GMEL.).—SCHRENCK, Reis. Amurl., I, p. 462 (1860).—RADDE, Reis. Süd. Ost-Sibir., II, (p. 354) (1863).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 338.—TACZAN., J. f. Orn., 1873, p. 108.—*Id. ibid.*, 1874, p. 336.—*Id., ibid.*, 1875, p. 256.—*Id.*, Orn. Faun. Vost. Sibir., p. 67 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 42.—*Id., ibid.*, 1883, p. 343.

1873.—*Anser middendorffi* SEVERZOW, Turkest. Jevotn. (pp. 70, 149).—*Id.*, J. f. Orn., 1874, p. 435.—*Id.*, Ibis, 1876, p. 416.

1875.—*Anser segetum* var. *serrirostris* TACZAN., J. f. Orn., 1874, p. 333 (*nec* SWINH.).

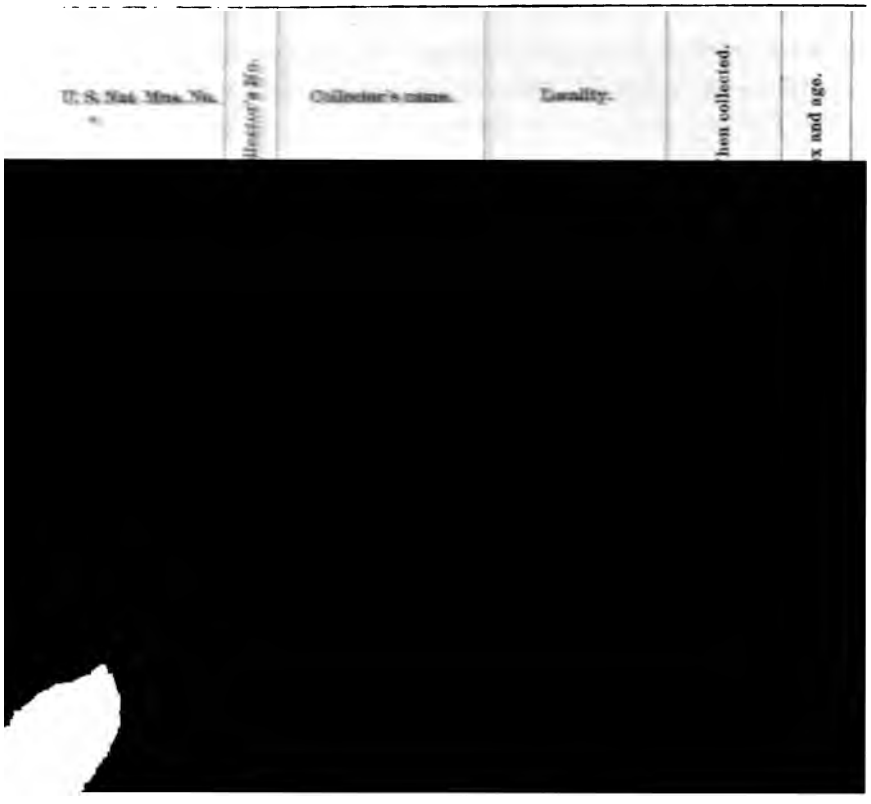
1875.—*Anser segetum* SWINH., Ibis, 1875, p. 456 (*part*).—BLAKIST. & PRYER, Ibis, 1878, p. 212 (*part*) —*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 182 (*part*).—*A. segitum. Id., ibid.*, X, 1882, p. 94 (*part*).—BLAKIST., Chrysanth., 1883, p. 27 (*part*).—(*segetum*) *Id.*, Amend. List B. Jap., p. 8 (*part*).

The state of things in regard to the species of geese of Eastern Asia is in a deplorable condition, and with my scanty material I can hardly expect to solve the question. With all our doubts it is, however, most fortunate that the geese have not suffered the common fate of difficult birds of that region, viz, to be lumped together under one heading. If that had been the case it would have been hopeless to try to unravel the confusion. This confusion goes even so far that Taczanowski, who, in 1877, enumerates as No. 372 *Anser grandis* PALL., and as No. 371 *Anser grandis* MIDD., *nec* PALL. (!), still in 1883 speaks of *Anser grandis* MIDD., a form which already, ten years before, was called *Anser middendorffi* by his countryman, Severzow.

As already stated, my material is rather scanty, consisting of the following specimens: Four birds from Europe, referable to *A. segetum* and to *A. segetum arvensis*. Three birds from Bering Island, which certainly belong to *A. middendorffi* (= *grandis* MIDD.), as will be shown below. One specimen from Shanghai, which I take to be a typical *A. segetum serrirostris* for reasons to be discussed further on.

It is at first sight evident that these birds belong to two groups, o
with rather slender bills, to which all the European specimens are
referable," the other with much heavier bills ("huge bills," as Swinl
says), to which all the eastern birds belong. In coloration I can det
no difference, except that the eastern specimens have the heads p
decidedly more brownish, a feature which, according to Schrenck's sta
ment, is not constant. This brown wash seems to me to be due t
similar cause to that which colors the heads of the swans more or l
rusty. This is especially striking in specimens which still have
white semitransparent spots on the feathers bordering the bill, in wh
these white spots are tinged exactly in the same manner as in the swa
A white-fronted goose before me presents the same feature. If in
swans the rusty color is due to external staining, then the same is
case with the brown color of the heads of the eastern geese. As
rest of the plumage is essentially the same both in the western and
eastern birds, the whole question as to their distinctness become
question of size.

Before proceeding further a comparative table of dimensions may
be out of place.



U. S. Nat. Mus. No.	Wings beyond tail.	Wing.	Tail-feathers.	Expos. culmen.	Bill along gape.	Bill to hind border of nostrils.	Nail of bill.	Height of bill behind nail.	Height of bill at base.	Breadth of bill at middle of nostrils.	Tarsus.	Middle toe with claw.	Number of lamellæ.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
92824	10	495	143	75	72	53	19	18	40	25	96	93	20
92825	25	463	134	68	66	48	18	.....	37	24	86	82	20
101267	.....	435	122	63	67	47	18	16	35	24	85	81	23
85756	.....	500	145	60	64	45	16	.....	36	25	82	82	20
34099	.....	(*)	135	63	63	42	15	11	32	21	85	84	24
57160	.....	470	134	61	62	40	16	13	30	20	.....	80	22
57161	.....	445	128	60	63	42	17	13	30	20	.....	74	24
57162	.....	440	121	60	62	40	16	13	30	20	.....	.....	26

* Moulting.

The difference in the dimensions of the bills of the two groups is so striking that no further comment is necessary. It will, however, be seen that the eastern birds show quite a considerable difference too in the bill, as the latter in the Chinese bird is not longer than in the European forms, while its height and breadth are almost identical with the corresponding dimensions of my Bering Island birds. There is also another difference. If the measurement of the total length (28 inches) given on the label is reliable, the Shanghai bird is a considerably smaller bird, having, however, both wings and tail longer than even the male bird from Bering Island. In the coloration I can see no tangible difference.

I will not deny even the probability of these differences being only individual variation within the same species, but I do not feel justified in uniting them under the same name, as long as there exists a possibility of their being distinct. Should this be proven, I would be rightly blamed if adding to the present confusion by unnecessarily lumping them together. This course is the safer one also for the reason that most writers on the birds of Eastern Asia recognize two or more forms of *A. segetum*.

The next question is, what names shall be applied to the two forms.

In the first place it may now be regarded as a well established fact that Gmelin's and Pallas's *grandis*, which has the bill nearly 4 inches long, is a bird quite different from either of the two forms here discussed. That Middendorff's *grandis*, however, is identical with the specimens from Bering Island can hardly be doubted, so well do their measure-

ments agree with those given as taken from typical Amur specimens.* They will therefore have to stand as *A. segetum middendorffi.*

The Chinese specimen is probably entitled to the name *A. segetum serrirostris* † on account of its locality. It is difficult to make anything out of Swinhoe's description. He says (P. Z. S., 1871, p. 417): "They are of large size, and peculiar in having huge bills approximating that of *A. grandis.* I have handled several, and they were all so distinguishable." The "*A. grandis*" with which Swinhoe was acquainted was only Middendorff's "*grandis*" (cf. P. Z. S., 1863, p. 323), as the true *grandis* of Pallas and Gmelin at that time had not yet been rediscovered. If the "hugeness" of the bill in his specimen only approximated that of *grandis*, it must have been somewhat similar to that of the Shanghai bird in the National Museum.

Not knowing of the occurrence in Eastern Asia of a slender-billed form like the typical *A. segetum*, I have referred all instances of the latter name to *serrirostris*, where it has been used in opposition to *A. middendorffi.*

It seems as if both forms occur in Japan. In the different lists of the birds of Japan, published by Blakiston and Pryer, we find repeatedly: "There seem to be two forms, a large and a small, possibly separable." Captain Blakiston has most liberally placed his manuscript notes in my hands for a critical review, but as only measurements of the bills of a few specimens are given I can throw very little light on the present question. The measurements given all belong to *A. middendorffi*

stretched backwards. Weight 10 pounds.* Iris dark brown. Bill brownish black, with a clear yellow band across the bill.

Not long after the drawing (pl. vii, fig. 1) was made the color changed to a brownish orange, paler and more approaching flesh-color anteriorly. Feet orange, with more yellowish webs, and black nails. Rather lean.

No trace of white on feathering bordering the bill.

♀ ad., *U. S. Nat. Mus. No.* 92825, *L. Stejneger, No.* 2023; *Ladiginsk, Bering Island, May* 10, 1883.

Middle toe reaches 68mm beyond the tail. Weight 8¼ pounds. Iris dark brown. Color of bill very much as in the specimen above, the yellow, however, being of a paler shade, and not extended behind the nostrils. Feet as in the foregoing. Rather fat. Eggs swollen, the largest one having a diameter of 15mm.

Feathering along the base of bill with faint traces of white semilunes, these, however, being strongly tinged with rusty.

Grebnitski's specimen (No. 101207) is very much like the latter, but there are faint yellowish mottlings along the lower border of the nostrils, and no trace of white on the feathers encircling the bill.

This goose, which is said to be very common in many parts of Kamtchatka, is not of regular occurrence on Bering Island even during the migrations. The appearance of a small flock in May, 1883, out of which the present pair were shot, was due to the same cause which brought so many Kamtschatkan species over to the islands. From Governor Grebnitski I afterwards received a specimen shot on Bering Island May 22, 1884.

58. Anser albifrons gambeli (HARTL.).

1827.—*Anas albifrons* BONAP., Specchio Comp., p. 70.—*Anser a.* SWINH., Ibis, 1875, p. 456.—*Id., Ibid.*, 1877, p. 146.—BLAKIST. & PRYER, Ibis, 1878, p. 212.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 182.—*Id., ibid.*, X, 1882, p. 95.—BLAKIST., Amend. List B. Jap., p. 8 (1884).

1852.—*Anser gambeli* HARTL., Rev. and Mag. Zool., 1852, p. 7.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 294.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 5 (1873).—*Id.*, Avif. Aleut. Isl. west Unal., p. 6 (1874).

1852.—*Anser erythropus* BAIRD, Stansbury's Rep., 1852 (p. 321) (*nec* LIN.).—SCHLEG., Mus. P. B. Anser., p. 110 (1867).

1872.—*Anser albifrons* var. *gambeli* COUES, Key, 1 ed., p. 282.—NELSON, Cruise Corwin, p. 93 (1883).—TURNER, Auk, 1885, p. 158.

1875.—*Anser brachyrhynchus* SWINH., Ibis, 1875, p. 456 (*nec* BAILL.).—BLAKIST. & PRYER, Ibis, 1878, p. 212.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 182.—*Id., ibid.*, X, 1882, p. 95.—SEEB., Ibis, 1883, p. 369.—BLAKIST., Chrysanth., 1883, p. 27.—*Id.*, Amend. List B. Jap., p. 33 (1884).

Schlegel has already pointed out that the Japanese white-fronted geese belong to the large American form which, by Hartlaub, has been called *gambeli*, and Nelson gives it as occurring on the Siberian coast of Bering Sea. The specimen obtained by me on Bering Island confirms these statements, since it certainly belongs to the typical *A gambeli*, as

* Cfr. Severzow (*l. c.*), "10–10½ lb."

will be seen from the measurements given below; it matches ave North American specimens in every particular.

On the average the American birds are larger and their bills bi than true *A. albifrons*, although the difference is much less than tween the latter and *erythropus*. In the United States National seum, however, there is a specimen said to be from Abydos, whic fully as large as the average American birds. The locality is not doubted, however, and the specimen may have come from America. the other hand, a winter specimen from Texas is not larger than typ *albifrons*, but is probably a migrant from Greenland, where this f breeds and where *A. gambeli* is not known to occur.

At all events, the measurements which I have taken have convin me that *gambeli* is only a race or subspecies of *albifrons*, while the la may be regarded as specifically distinct from *erythropus*.

The specimen from Bering Island measures:

♀ *ad., U. S. Nat Mus. No.* 92826, *L. Stejneger No.* 2021; *Kamennij valley, Bering Isl May* 10, 1883.

Total length 685mm. Closed wings beyond tail 20mm. Middle toe (without cl reaches tip of tail, legs being stretched backwards. Wing 417mm. Tail-feath 124mm. Bill, from tip to frontal feathering, 51mm; along gape to angle of mo 52mm; to posterior angle of nostrils 37mm. Breadth of bill at middle of nostrils 18 height at base 29mm. Tarsus 78mm. Middle toe with claw 76mm.

The following notes were taken down immediately after the bird w shot and a colored drawing (pl. vii, fig. 2) made:

Weight 6¼ pounds. Iris very dark brown. Bill, milky white; the anterior part tomia with a very faint rosy tinge; the posterior parts with a hardly perceptible w of bluish; a square figure on culmen, edges of nostrils, a small spot beneath th and the basal two-thirds of the lower half of the under mandible, cadmium yell naked skin on mental angle and corner of mouth of the same color, but pale stripe along the forehead pale brownish yellow; nail cream colored; naked eye-r dark brownish gray. Feet vivid cadmium yellow; webs somewhat paler and p yellow; nails horny white. Fat.

The colors changed about an hour after the colored drawing was ished, the white becoming flesh-color.

This specimen was shot on the same day on Bering Island as the p of the foregoing species, but in a different part of the island. At le three were seen. It seems to occur regularly during the spring mig tion, and has already been mentioned by Steller from Bering Isla In 1882 I had the opportunity of examining two specimens shot on La Saranna, Bering Island, in April. They were prepared by Mr. Gr nitski, who had them forwarded to St. Petersburg. The culmen of t male measured 51mm.

59. Branta canadensis hutchinsii (RICH.).

1826.—*Anser canadensis* PALL., Zoogr. Ross. As., II, p. 230.

1831.—*Anser hutchinsii* RICHARDS. in Sw. & Rich. Faun. Bor. Amer., II, 470.—*Bernicla h.* DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 295.—FINSCH, Abh. Ver. Brem. III, 1872, p. 20.—SEEB., Ibis, 1882, p. 369.—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 96.—BLAKIST., Amend. List B. Jap., pp. 9, 33 (1884).

1836.—*Anser leucopareius* BRANDT, Bull. Sc. Acad. St. Petersb., I, 1836, p. 37.—*A.* (*Bernicla*) *l. Id.*, Descr. and Icon. Anim. Ross. Nov. Aves, I, p. 13.—*Bernicla l.* BLAKIST. & PRYER, Ibis, 1878, p. 212.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 183.—*Branta l.* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 70.

1872.—*Branta canadensis* var. *hutchinsii* COUES, Key N. Am. B., p. 284.—TURNER, Auk, 1885, p. 158.

A comparison of undoubted specimens of the true *hutchinsii* with skins from the Aleutian Islands and Brandt's original description, containing the dimensions of *leucopareius*, convinces me that these two names are absolute synonyms, being different, however, from what has usually been called *leucopareia* by American writers. In 1858 Baird (Hist. N. Amer. B., p. 765) headed a species *leucopareia* to which he gave the name *occidentalis* in the text, suspecting it to be different from Brandt's bird, as it really was. Afterwards the name *leucopareia* was applied by Dr. Coues to a small short-billed race, specimens of which were obtained at the Prybiloff Islands, and herein American authors have afterwards followed him when speaking of the same form as occurring in Alaska, or, during the migrations, in more southern localities along the western coast. This race, which probably is a northern and northwestern form of *occidentalis*, in the same manner as *hutchinsii* seems to be a northern and northwestern form of the true *canadensis* has been called *Branta minima* by Robert Ridgway. Both this and *hutchinsii* (= *leucopareia*) inhabit Alaska, and hence the confusion.

Several marks have been given as distinctive of the two small forms, *hutchinsii* and *minima*, *e. g.*, the absence or presence of a white ring round the lower part of the neck, the absence or presence of a black "bridge" separating the two white cheek-patches, &c., but none of these characters hold good through an extensive series. The really distinctive marks seem to be the relative length of the bill, it being longer in *hutchinsii*, besides the lighter surface of the latter form, the color of the breast fading gradually into the white of the belly, while in *minima* the limit is abrupt and well marked. Both forms have sixteen tail-feathers, and are about of the same size.

Captain Blakiston was correct in identifying the birds from Jap *leucopareia*, and so was Mr. Seebohm when he afterwards referred to the true *hutchinsii*, but he is entirely wrong when saying (Ibis, p. 369): "A skin sent (No. 2621) proves to be of this species (*hutch* and not of *B. leucopareia*. The former has sixteen tail-feathers, wit wing 16 inches long, whilst the latter is said to have eighteen feathers, with the wing 18 inches long." He evidently confounds *pareia* with *B. occidentalis* BAIRD, which, like *canadensis*, is said to eighteen to twenty rectrices,(?) and the wing measuring from 16.25 inches, while *leucopareia* (= *hutchinsii*) has only sixteen tail-fea and the wing from 13.60 to 16.35 inches long. I find in Captain B ton's manuscript notes measurement of birds from the Kuriles ing closely with those of true *hutchinsii*. Mr. Seebohm has appa been led to make the above statement by not being aware that B *leucopareia* (B. N. A., p. 765) is the same author's *occidentalis*, wh different from Brandt's *leucopareia*.

List of specimens collected.

U. S. Nat Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond tail.	Wing.	Tail-feathers.	Bill from frontal feathers.	Bill along gape.	Bill to hind border of nostrils
					mm.	mm.	mm.	mm.	mm.	mm.	mm
[redacted]											

This species has also been found breeding on the Kurile Islands, and seems to pass the winter in Japan. It is nowhere common in the Old World, where it probably is only an immigrant of comparatively late date.

60. Branta nigricans (LAWR.).

1826.—*Anser brenta* PALL., Zoogr. Ross. As., II, p. 229 (*part*).
1846.—*Anser nigricans* LAWRENCE, Ann. Lyc. N. Y., IV, 1846, p. 171.—*Bernicla n.* DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 295.—DALL, Avif. Aleut. Isl. west Unal., p. 6 (1874).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 166.—NELSON, Cruise Corwin, p. 94 (1883).—BLAKIST., Amend. List B. Jap., p. 33, (1884).
1858.—*Anas bernicla* KITTL., Denkw., II, p. 384 (*nec* LIN.).
1878.—*Bernicla torquata* BLAKIST. & PRYER, Ibis 1878, p. 212 (*nec* VIEILL.)—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 183.—*Id.*, *ibid.*, x. 1882, p. 96.
1882.—*Bernicla brenta nigricans* COUES, Check-list, 2 ed., p. 112.—SEEB., Ibis, 1884, p. 32.

The Black Brant has already in "The Ibis" for January of last year been shown to occur in the eastern part of the Palæarctic region, as it winters in Northern Japan.

On the islands visited by me it only occurs during the migrations, and even then very sparingly. A young female, the only specimen caught during my stay, was obtained late in fall, when swimming at sea, a little off the northern shore. It kept company with some individuals of *Phalocrocorax pelagicus*, no others of its own kind being seen in the neighborhood. The œsophagus contained green algæ and leaves of a *Zostera*. It was very fat. The measurements are as follows:

♀ *jun.*, *U. S. Nat. Mus. No.* 92828, *Stejneger*, *No.* 1712; *Severnij*, *Bering Island*, *November* 8, 1882.

Total length 568mm. Tail beyond wings 15mm. Wing 330mm. Tail-feathers 88mm. Bill along gape 36mm. Tarsus 64mm. Middle toe, with claw 55mm. Weight 5 pounds. Iris dark brown.

61. Olor cygnus (LIN.).

1758. *Anas cygnus* LIN., Syst. Nat., 10 ed., I, p. 122 (*part*).
1779. *Anas olor* PALL., Sv. Vet. Acad. Handl., XL, p. 27 (*nec* GMEL., 1788).—*Cygnus o. Id.*, Zoogr. Ross. As., II, p. 211 (*part*) (1826).
1809.—*Cygnus musicus* BECHST., Gemein. Naturg. Deutschl., IV, p. 830.—MIDDEND., Sibir. Reise, II, 2 (p. 224) (1853).—SCHRENCK, Reis. Amurl., I, p. 455 (1860).—SWINH., Ibis, 1862, p. 254.—*Id.*, *ibid.*, 1875, p. 456.—*Id.*, P. Z. S., 1863, p. 323.—*Id.*, *ibid.*, 1871, p. 416.—BLAKIST., Ibis, 1862, p. 332.—*Id.*, Chrysanth., 1883, p. 96.—*Id.*, Amend. List B. Jap., p. 23 (1884).—RADDE, Reis. Süd. Ost-Sibir., II (p. 348) (1863).—DYBOW. & PARVEX., J. f. Orn., 1868, p. 338.—PRZEW., Potesch. Ussur. (n. 189) (1870).—TACZAN., J. f. Orn., 1873, p. 108.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, Bull. Soc. Zool. France, 1877, p. 44.—*Id.*, *ibid.*, 1883, p. 343.—*Id.*, Orn. Faun. Vost. Sibir., p. 68 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 211.—*Id.*, Tr. As. Soc. Jap. VIII, 1880, p. 192.—*Id.*, *ibid.*, X, 1882, p. 94.

No specimens of this swan were procured, but I identified several heads in Petropaulski as belonging to the Hooper, which, in fact, is the common species of this region. During the winter 1882–'83, swans were repeatedly observed on Bering Island, but as they were extremely shy none were obtained, nor was it even possible to get so near to them as to be able to identify the species with absolute certainty. I have little doubt, however, that they belonged to the species in question, and not to the following.

The first ones were observed on October 15, 1882, when a flock of six individuals was seen flying over the village, Bering Island, from west to east. Two seem to have passed the winter at Severnij, where they were observed on January 10 and March 18, 1883. Another was reported from Zapadnij, April 24, 1883.

62. Olor columbianus (ORD).

1815.—*Anas columbianus* ORD in Guthrie's Geogr. 2d Amer. ed. (p. 319).—*Olor c.* TURNER, Auk, 1885, p. 157.

1831.—*Cygnus americanus* SHARPLESS in Doughty's Cab. Nat. Hist., I, No. 8, p. 185.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 293.—DALL, Avif. Aleut. Isl., west Unal., p. 6 (1874). – *Olor a.* NELSON, Cruise Corwin, p. 92 (1883).

On November 3, 1882, one of the natives of Bering Island brought me a young swan, shot at Fedoskija, which puzzled me not a little.

According to all information, the two species of swans of Eastern Asia should be *Olor cygnus* and *Olor bewickii*, and the specimen, therefore, ought to belong to one of them. The young of these species have been considered difficult to distinguish, but in my "Monograph of the Cygninæ" (Pr. U. S. Nat. Mus., Stat. 1882, p. 174 seqv.) I had pointed out a character, which I was now going to try. A close examination showed me that my specimen, a young male, in its gray plumage, was just a little larger than the largest *O. bewickii* ever measured by me (more than twenty), being much smaller, however, than young *O. cygnus* (= *musicus*) of the same age. But, while agreeing better with *bewickii* as to size, the bill was essentially that of *O. cygnus*, not high at the base, with nearly perpendicular *processus maxillaris* of the nasal bone, as in the former, but rather depressed and with the said *processus* decidedly oblique, as in the latter. In addition to these features the bird was remarkable for having the feet colored white; not light gray, but decidedly white. I at first fancied it to be a smaller eastern representative of *O. cygnus*, but heads of adults of the latter from Kamtschatka convinced me that eastern specimens of the Hooper are as typical as those from Europe.

The measurements agreed, however, still better with those of *Olor columbianus* (= *americanus*), and a careful comparison with specimens of the latter in the National Museum renders it absolutely certain that the bird shot on Bering Island belongs to this American species. This is the first record of the Whistling Swan having been obtained in Asia.

The young American Whistling Swan agrees with *O. cygnus* in having the bill depressed at base and the *processus maxillaris* of the nasal bone much oblique, thus being easily distinguished from *Olor bewickii*. It is, however, much smaller than *O. cygnus*, and the outline of the culmen is different, being slightly concave in the latter, while straight or rather convex in *O. columbianus*.

My specimen is a perfect counterpart of examples from various parts of America in the National Musuem, being only a trifle lighter and with whitish feet. In the latter respect it seems to agree with No. 81230 from Alaska, which in all probability had the feet equally light when alive. In all other respects the Bering Island bird matches No. 85579 (cfr. description and measurements in my Monograph, *tom. cit.*, p. 212). A comparison of the measurement of the two specimens will be appended below.

The following notes on the color of the naked parts were written down immediately after receiving the bird: Iris dark brown. Bill and lores whitish flesh-color, tinged with reddish in front of the nostrils, with bluish behind those, and with yellowish at the base, and on the naked eye-ring; terminal half of the portion between nostrils and tip, including the nail, as also the borders of the nostrils and tomia, blackish; naked skin of mental angle flesh-color. Feet white, with a faint bluish tinge, and with a yellowish wash on the lower part of tarsus in front, and on the sides of the toes; webs, under surface of feet, and upper portion of tarsus mottled with dark gray; claws horny white, black towards the tips.

Table of dimensions.

[Taken from the fresh specimens.]

Olor columbianus.	U. S. Nat. Mus. No. 85579, Currituck, North Carolina, November 28, 1881, jun.	U. S. Nat. Mus. No. 92823; Stejneger No. 1700, Bering Island, November 3, 1882, ♂ jun.
	mm.	mm.
Total length	1183	11[illegible]
Tip of tail beyond closed wings	63	[illegible]
Length of bill along gape	84	[illegible]
Length from tip to the front of the nostrils	39	[illegible]
Length to the fore border of the eye	108	[illegible]
Breadth of bill at the middle of the nostrils	31	[illegible]
Length of toes with claws:		
Outer toe	130	[illegible]
Middle toe	138	[illegible]
Inner toe	107	[illegible]
Hind toe	26	[illegible]
Length of tarsus	110	[illegible]
Length of wing	510	[illegible]
Length of longest tail-feathers	137	[illegible]
Stretch of wings		[illegible]

The weight of the Bering Island specimen was 12½ pounds.

It was most likely an accidental straggler, as, in all probability, the other swans observed during the winter belonged to the species common in the region, *O. cygnus*.

On Copper Island it is only met with during the migrations, as there are few or no localities suitable for it to breed.

In Kamtschatka it is, of course, of common occurrence.

List of specimens.

U. S. Nat. Mus. No.	Collector's No.	Locality.	Date.	Sex and age.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.
69117	1045	Bering Island	May 13, 1882	♂ nd.	283	92	55	46	61
101218	G. 21	....do	April—, 1884	(♂) ad.	280	95	55	44	57

REMARKS.—Iris dark brown. Bill olive; nail black. Feet light salmon red; webs blackish towards the middle.

Eggs were taken during the first part of June and measure as follows:

U. S. Nat. Mus. No. 21795, *Stejn.* No. 1172, Toporkoff Island, June 6, 1882; belonging to a clutch of nine; 60 by 41.5mm; 59 by 42.5mm.

Mus. No. 21781, S. No. 2194, Kamennij Vall., Bering Island, June 19, 1883; set complete: 56.5 by 44mm; 56.5 by 44mm; 56.25 by 42.5mm; 55 by 43mm; 56 by 42mm; 56 by 42.5mm; 56 by 42.5mm.

64. Dafila acuta (LIN.).

1758.—*Anas acuta* LIN., Syst. Nat., 10 ed., I, p. 126.—NORDMANN in Erman's Verz. Th. Pfl., p. 18 (1835).—TEMM. & SCHLEG., Faun. Jap. Av. (p. 128).—MIDDEND., Sibir. Reis., II, 2 (p. 233) (1853).—KITTL., Denkw., II, p. 292 (1858).—SCHRENCK, Reis. Amurl., I, p. 481 (1860).—RADDE, Reis. Süd. Ost-Sibir. II (p. 371) (1863).—SWINH., P. Z. S., 1863, p. 324.—PRZEW., Putesch. Ussur. (n. 204) (1870).—FINSCH, Abh. Brem. Ver., III, 1872, p. 66.—*Dafila a.* CASSIN, Exp. Jap. Perry, II, p. 231 (1857).—SWINH., Ibis, 1861, p. 345.—*Id., ibid.*, 1867, p. 399.—*Id., ibid.*, 1877, p. 147.—*Id.*, P. Z. S., 1871, p. 413.—BLAKIST., Ibis, 1862, p. 372.—*Id.*, Amend. List B. Jap., p. 9 (1884).—WHITELY, Ibis, 1867, p. 207.—DALL & BANNIST., Tr. Chicag. Acad., I, 1869, p. 297.—TACZAN., J. f. Orn., 1873, p. 109.—*Id., ibid.*, 1874, p. 337.—*Id.*, Orn. Faun. Vost. Sibir., p. 69 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 45.—*Id., ibid.*, 1883, p. 343.—BLAKIST. & PRYER, Ibis, 1878, p. 213.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 184.—*Iid., ibid.*, X, 1882, p. 97.—SEEB., Ibis, 1879, p. 22.—NELSON, Cruise Corwin, p. 96 (1883).

1816.—*Anas caudacuta* LEACH, Syst. Cat. M. B. Brit. Mus., p. 38.—PALL., Zoogr. Ross. As., II, p. 280 (1826).

The Pintail (Russ. "*Vostrochvost*") arrives at Bering Island during the latter part of April. In 1883 I observed the first ones, while on a sledge trip to the southern end of the island, between Comandore and Polovino, on the 23d of April. Four days later they were seen in the neighborhood of the village. From this time on they were found everywhere in suitable places, as this species is undoubtedly the most numerous

among the fresh-water ducks on the island. Still, on the 20th of May I found them in flocks, but soon the pairs dispersed over the tundras and the swamps of the valleys, and already the 4th of June a nest with seven eggs was secured on Toporkoff Island; six days after, another nest with five eggs was taken.

I have no sure record of its having been found breeding in Copper Island, where, in fact, localities suitable for fresh-water ducks are rather scarce. But I have little doubt that a few pairs breed in Pestschanij or in Gladkovskij.

The eggs measure as follows:

U. S. Nat. Mus. No.	Stejneger No.	Diameters.	Date.	Locality.	Remarks.
		mm.			
21784	2143	50 by 37	June 9, 1883	Bering Island	Whole clutch.
		50.5 by 36			
		50 by 36.5			
		50 by 37			
		50 by 36.5			
21796	1162	53 by 39	June 6, 1882	do	Clutch contained nine eggs.
		56 by 39			
		53 by 38.5			
		54.5 by 39			
		53.5 by 38			
		54 by 39			
		53 by 38			

[redacted]

65. Nettion crecca (LIN.).

1758.—*Anas crecca* LIN., Syst. Nat., 10 ed. I, p. 126.—PALL. Zoogr. Ross. As., II, p. 263, (1826).—TEMM. & SCHLEG. Faun., Japan, Av. (p. 127) (1849).—MIDDEND, Sibir. Reis., II. 2 (p. 230) (1853).—KITTL., Denkw., II, p. 292 (1858).—SCHRENCK, Reis. Amurl., II, p. 474 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 367) (1863).—SWINH., P. Z. S., 1863, p. 324.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 338.—PRZEW., Put. Ussur. (n. 205).—BLAKIST., Ibis, 1876, p. 335.—*Querquedula c.* SWINH., Ibis, 1861, p. 345.—*Id.*, *ibid.*, 1865, p. 347.—*Id.*, *ibid.*, 1867, p. 399.—*Id.*, *ibid.*, 1870, p. 366.—*Id.*, *ibid.*, 1877, p. 147.—WHITELY, Ibis, 1867, p. 207.—TACZAN., J. f. Orn., 1873, p. 110.—*Id.*, *ibid.*, 1874, p. 337.—*Id.*, Orn. Faun. Vost. Sibir., p. 70 (1877.)—*Id.*, Bull. Soc. Zool. France, 1877, p. 46.—*Id.*, *ibid.*, 1883, p. 343.—BLAKIST. & PRYER, Ibis, 1878, p. 213.—*Id.*, Tr. As. Soc. Jap. VIII, 1880, p. 184.—*Id.*, *ibid.*, X, 1882, p. 97.—SEEB., Ibis, 1879, p. 22.—BLAKIST., Chrysanth., 1883, p. 27.—*Id.*, Amend. List B. Jap., p. 9 (1884).—*Nettion c.* BLAKIST., Ibis, 1862, p. 332.

List of specimens.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Expos. culmen.
					mm.	mm.	mm.	mm.
89106	1038	Bering Island	May 11, 1882	♂ ad.	368	183	66	35
89107	1049	....do	May 14, 1882	♀ ad.	338	168	61	33
89108	1409	....do	Aug. 5, 1882	♂ juv.	....	.....	.....	31
92334	1408	....do	Aug. 5, 1882	♀	338	162	58	31
101211	G. 80	.... do	Apr. —1884	(♀) ad.	.....	175	60	36
92335	2636	Velutschka, Kamtschtka	Sept. 21, 1883	♀	....	168	62	34

No. 89106.—Iris hazel. Bill black, with a small light spot between the nostrils and the tomium. Feet light brownish gray; webs darker brownish.

No. 89107.—Iris hazel. Bill olive gray, blackish towards the point; culmen, except a V-shaped space along the angle of the forehead, with black spots; basal two-thirds of upper tomia ocher yellow, as also the lower jaw and mental angle. Feet brownish gray; webs darker than in the foregoing number.

No. 92334.—Iris dark yellowish gray.

The common Teal (*Tschirok* of the Russians) is the commonest fresh-water duck of the region next to the Pintail. It breeds numerously in all suitable places on Bering Island, and a young bird, nearly fledged, which I shot on Copper Island July 26, 1883, proves that it also breeds there, where the localities will in any way allow it to do so, as for instance at Pestschanij Osero.

In 1883 the first Teal was seen in a flock of *Anas boschas*, near the village, on the 13th of April, and another was observed on the southern Kitovaja Retschka. The weather had changed the foregoing day from cold to mild, with rain and southerly wind. Between the 22d and 27th of April I found them very numerous along the southeastern shore, between Cape Tolstoj and Bujan.

In the beginning of August the young ones were already fit for f
I need not say that the young teals were looked upon as a very
come change in our somewhat uniform diet of corned beef and salt

An egg cut from the oviduct, June 11, 1883 (No. 2196; U. S. Nat. M
No. 21803), measures 43 by 33.5mm.

66. Querquedula querquedula (LIN.).

1758.—*Anas querquedula* LIN., Syst. Nat., 10 ed., I, p. 126.—PALL., Zoogr. Ross. As
p. 264 (1826).—MIDDEND., Sibir. Reis., II, 2 (p. 229) (1853).—RADDE, R
Süd. Ost-Sibir., II (p. 371) (1863).—SWINH., P. Z. S., 1863, p. 324.—DYB
& PARVEX, J. f. Orn., 1868, p. 338.—PRZEW., Putesch. Ussur. (n.
(1870).—*Pterocyanea q.* TACZAN., J. f. Orn., 1873, p. 110.—*Id.*, Orn. F
Vost. Sibir., p. 70 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 46.—*Id.*,
1883, p. 343.

1758.—*Anas circia* LIN., Syst. Nat., 10 ed., I, p. 127.—*Querquedula c.* SWINH.,
1863, p. 434.—*Id.*, *ibid.*, 1867, p. 407.—*Id.*, P. Z. S., 1870, p. 427.—*Id.*,
1871, p. 418.—TACZAN., J. f. Orn., 1874, p. 337.—BLAKIST. & PRYER,
1878, p. 214.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 185.—*Id.*, *ibid.*, X, 1
p. 98.—BLAKIST., Amend. List B. Jap., p. 34 (1884).—SEEB., Ibis, 188
175.—STEJNEGER, Naturen, 1884, p. 9.

The Garganey Teal is a bird of rather rare occurrence everywh
and in Eastern Asia it is not more numerous than elsewhere. It
not been taken on the islands, and a male in very fine plumage, s
on a hunting excursion to Avatscha on the 25th of May, 1883, was
only specimen I obtained in Kamtschatka.

The measurements of this individual are as under:

U. S. Nat. Mus., No. 92,833; *L. Stejneger, No.* 2056. ♂ *ad. Avatscha, Kamtsch.*,
25, 1883.

Total length, 380mm; tail beyond wings, 5mm; wing, 193mm; tail-feathers, 66
exposed culmen, 38mm; tarsus, 30mm; middle toe with claw, 42mm.

The following notes were taken down from the fresh bird: Iris
lowish brown; bill dark pearl gray, with an olive wash on culm
and anterior half; feet gray, with a faint brownish tinge on the join
webs blackish. Rather fat. Testes very large, swollen.

67. Eunetta falcata (GEORGI).

1775.—*Anas falcata* GEORGI, Reis. Russ., I (p. 167).—PALL., Zoogr. Ross. As., II, p.
(1826).—MIDDEND., Sibir., Reis., II, 2 (p. 231) (1853).—KITTL., Denkw.
p. 307 (1858).—SCHRENCK, Reis. Amurl., I, p. 476 (1860).—RADDE, R
Süd. Ost.-Sibir., II (p. 369) (1863).—SCHLEG., Mus. P. B. Anser, p.
(1866).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 338.—PRZEW., Pute
Ussur. (n. 201).—BLAKIST., Ibis, 1876, p. 335.—*Mareca f.* CASSIN, Exp.
Perry, II, p. 231 (1857).—*Eunetta f.* SWINH., P. Z. S., 1871, p. 419.—
Ibis, 1874, p. 164.—STEJNEGER, Naturen, 1884, p. 9.—*Querquedula f.* T
ZAN., J. f. Orn., 1873, p. 109.—*Id.*, *ibid.*, 1874, p. 337.—*Id.*, *ibid.*, 1875
257.—*Id.*, Orn. Faun. Vost. Sibir., p. 69 (1877).—*Id.*, Bull. Soc. Zool. Fra
1877, p. 45.—*Id.*, *ibid.*, 1883, p. 343.—BLAKIST. & PRYER, Ibis, 1878, p. 21
Id., Tr. As. Soc. Jap., VIII, 1880, p. 105.—*Id.*, *ibid.*, X, 1882, p. 96.—E
KIST., Amend. List B. Jap., p. 9 (1884).—*Nettion f.* STEJNEGER, Pr. U
Nat. Mus., 1883, p. 71.

1776.—*Anas falcaria* PALL., Reis. Russ. Reich, III (p. 701).—TEMM. & SCHLEG., Faun. Jap. Av. (p. —) (1849).—SWINH., Ibis, 1861, p. 345.—*Id.*, *ibid.*, 1862, p. 254.—*Id.*, P. Z. S., 1863, p. 324.—*Querquedula f.* BLAKIST., Ibis, 1862, p. 332.

1860.—*Querquedula multicolor* SWINH., Ibis, 1860, p. 67 (*nec* SCOPOLI ?).

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When obtained.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail feathers.	Edges culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
89112	1157	Bering Island	June 4, 1882	♂ ad.	435	.....	.....	.....	.....
92839	2047	Petropaulski, K	May 19, 1883	♂ ad.	494	0	245	71	43
92840	2053	Petropaulski, K	May 19, 1883	♂ ad.	.....	.....	243	73	43
92841	2061	Avatscha, K	May 25, 1883	♂ ad.	483	.....	240	69	41

No. 89112.—Iris dark hazel. Bill uniform horny black. Feet delicate light olive gray, with yellowish tinge on the scutellæ of the tarsus; joints darker grayish; webs and under side blackish brown. Contents of stomach, leaves of plants.

No. 92839.—Bill blackish gray, with an olivaceous tinge. Feet, middle gray, joints darker, webs blackish. Tip of middle claw—legs being stretched backwards—20^{mm} beyond tip of tail. Extremely fat. Testes large, swollen. Œsophagus contained grass.

The Falcated Teal (*Kassatoj Selesenn* of the Russians), perhaps the prettiest species of the whole group, is a regular summer visitant to Kamtschatka, but seems not to be very numerous. During my trip to Petropaulski in the spring of 1883 I obtained several adult males, but it must be remembered that the rivers and lakes were not open yet, and that snow covered the ground everywhere, so that the ducks which had already arrived were compelled to await the opportunity of getting at their summer resorts, therefore congregating in large numbers at the mouths of the rivers.

It has been observed on Bering Island during the spring migration, and a few pairs may perhaps even breed, for instance, in the upper part of Kamennij Valley, but it is at all events a very rare bird there. A single specimen, a beautiful male, was procured on the 4th of June, 1882.

68. Mareca penelope (LIN.).

1758.—*Anas penelope* LIN., Syst. Nat., 10 ed., I, p. 126.—PALL., Zoogr. Ross. As., II, p. 251 (1826).—NORDMANN in Erman's Verz., Th. Pfl., p. 18 (1835).—TEMM. & SCHLEG., Faun. Jap Av. (p. 127) (1849).—MIDDEND., Sibir. Reis., II, 2 (p. 229) (1853).—KITTL., Denkw., II, p. 292 (1858).—SCHRENCK, Reis. Amurl., I, p. 471 (1860).—RADDE, Reis. Süd Ost-Sibir., II (p. 363) (1863).—SWINH., P. Z. S., 1863, p. 321.—PRZEW., Putesch. Ussur. (n. 199) (1870).—BLAK., Ibis, 1876, p. 335.—*Mareca p.* CASSIN, Exp. Jap. Perry, III, p. 231 (1857).—SWINH., Ibis, 1861, p. 345.—*Id.*, *ibid.*, 1867, p. 399.—*Id.*, *ibid.*, 1870, p. 366.—*Id.*, *ibid.*, 1875, p. 457.—*Id.*, P. Z. S., 1871, p. 418.—BLAKIST., Ibis,

1862, p. 332.—*Id.*, Chrysanth., 1883, p. 27.—*Id.*, Amend. List B. Jap (1884).—WHITELY, Ibis, 1867, p. 207.—DALL, Avif. Aleut. Isl. Unal. e p. 5 (1873).—TACZAN., J. f. Orn., 1873, p. 110.—*Id.*, *ibid*, 1874, p. 337. Orn. Faun. Vost. Sibir., p. 70 (1877).—*Id.*, Bull. Soc. Zool. France, 18 46.—*Id.*, *ibid.*, 1883, p. 344.—COUES in Elliott, Affairs Alaska, p 191 (18 HARTING, Fauna Prybil. Isl., p. 29 (1875).—BLAKIST and PRYER, Ibis, p. 213.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 184.—*Iid.*, *ibid.*, X, 1882, p. ELLIOTT, Monogr. Seal-Isl., p. 130 (1882).—NELSON, Cruise Corwin, (1883).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Expos. culmen.	Tarsus.
					mm.	mm.	mm.	mm.	mm.
92829	2081	Bering Island.....	May 23, 1883	(♂) ad.	(481)	246	96	35	40
92830	1684	.....do	Oct. 13, 1882	jun.	420	238	80	29	35

No. 92830.—Iris hazel. Bill bluish-gray; tips, including nail, blackish. Feet *bluish*-gray faint yellowish wash; webs blackish.

The "*Svistsch*" or "*Svistun*," of the Russians, visits Bering Is during the spring migration, but, as it seems, not regularly or in e numbers every year. Thus in the spring of 1882 none were seen, v during the following spring, from the latter days of April to the week of June, they were numerous along the beaches of the north ern part of the island, from Ladiginsk to Tonkij Mys.

69. Mareca americana (GMEL.).

1788.—*Anas americana* GMEL., Syst. Nat., I, p. 526.—FINSCH, Abh. Brem. Ver., III, p. 66.—TURNER, Auk, 1885, p. 158.—*Mareca a.* DALL & BANNIST., Tr cag. Acad., I, 1869, p. 298.—BAIRD, Tr. Chicag. Acad., I, 1869 (p. 7 BEAN, Pr. U. S. Nat. Mus., 1882, p. 166.—NELSON, Cruise Corwin, (1883).

A single individual of the American Widgeon was found dead an the sand dunes near the village, Bering Island, on the 1st of May, It was moulting, the old plumage very worn, and new feathers pro ing all over the body. Some storm had probably carried it astra this species is not known as an inhabitant of the Asiatic side of Pacific Ocean. So far as I am aware, this is the first record of its ing ever been obtained in Asia. It was a female, and very lean.

This specimen is almost identical with No. 31947 U. S Nat. M a female from Lower California; shot in February, 1860. The only ferences are that the chin and upper throat are more brownish and spotted, and the chin partly shaded with black.

The measurements are as follows:

U. S. Nat. Mus. No. 92831, *L. Stejneger, No.* 2009. *Bering Island, May* 1, 1883. ♀ ad.

Total length, 448mm; tips of closed wings reach tip of tail; wing, 234mm; tail-feathers, 73mm; exposed culmen, 34mm; tarsus, 41mm; middle toe, with claw, 50mm.

Bill dark plumbeous blue; tips, including nail, tomia, and lower mandible, black; feet plumbeous, with a faint yellowish tinge; webs blackish.

70. Spatula clypeata (LIN.).

1758.—*Anas clypeata* LIN., Syst. Nat., 10 ed., I, p. 124.—PALL., Zoogr. Ross. As., II, p. 282 (1826).—NORDMANN in Erman's Verz., Thier. Pflanz., p. 18 (1835).—TEMM. & SCHLEG., Faun. Jap. Av. (p. 128) (1849).—MIDDEND., Sibir. Reis., II, 2 (p. 233) (1853).—KITTL, Denkw., II, p. 294 (1858).—SCHRENCK, Reis. Amurl., I, p 481 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 383) (1863).—SWINH., P. Z. S., 1863, p. 324.—PRZEW., Putesch. Ussur. (n. 206), 1870.—BLAKIST., Ibis, 1876, p. 335.—*Rhynchaspis c.* SWINH., Ibis, 1861, p. 345.—*Id., ibid.*, 1862, p. 254.—*Id., ibid*, 1867, p. 338.—TACZAN., J. f. Orn., 1873, p. 110.—*Id., ibid.*, 1874, p. 337.—*Id.*, Orn. Faun. Vost Sibir., p. 20 (1877).—*Id*, Bull. Soc. Zool. France, 1877, p. 46.—*Id., ibid.*, 1883, p. 343.—*Spatula c.* BLAKIST., Ibis, 1882, p. 332.—*Id.*, Amend. List B. Jap., p. 9 (1884).—WHITELY, Ibis, 1867, p. 207.—DALL & BANNIST., Tr. Chicag. Ac., I, 1869, p. 297.—SWINH., P. Z. S., 1871, p. 418.—*Id.*, Ibis, 1875, p. 457.—BLAKIST. and PRYER, Ibis, 1878, p. 214.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 185.—*Id., ibid.*, X, 1882, p. 98.—NELSON, Cruise Corwin, p. 96 (1883).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
92838	2033	Petropaulski	May 5, 1883	♂ ad.	473	0	228	77	65
92837	2038	do	May 17, 1883	♂ ad.	520	10	237	85	63
92836	2114	Bering Island	May 31, 1883	♂ ad.	499	10	236	83	65

No. 92838.—Iris, pale yellow; bill black, with the extreme point of the mental angle pale yellowish; feet pale reddish orange; webs violet gray, when alive, the violet tinge disappearing as soon as dead, the color of the web becoming brownish afterwards. Not fat. Tips of tail, tips of closed wings, and middle claw, legs stretched backwards, meet in one point.

The Shoveller, known to the natives by its Russian name, "*Soksun*," is one of the rarer ducks on Bering Island. A few pairs breed probably in the open valleys on the southeastern shore, as, for instance, at Polavino. In 1883 the first ones were observed by me, on the 24th of April, on the beach between Polavino and Slastnoj. At the village they were seen at the end of May, and during the first week of June.

During my stay in Petropaulski, from the middle of May, 1883, to the

end of the month, I found this duck very common at the mouth of the rivers, which at that time were still partly ice-bound. It was then, by far, easier to approach than any other of the many kinds of ducks assembled there waiting for the general breaking up of the rivers.

71. Aythya fuligula (LIN.).

1758.—*Anas fuligula* LIN., Syst. Nat., 10 ed., I, p. 128.—PALL., Zoogr. Ross. As., II, p. 265.—TEMM. & SCHLEG., Faun. Jap. Av. (p. —) (1879).—MIDDEND., Sibir. Reis., II, 2 (p. 47) (1853).—SCHRENCK, Reis. Amurl., I, p. 484 (1860).—RADDE, Reis. Süd. Ost-Sibir., II, (p. 375) (1863).—*Platypus f.* DYBOW. & PARVEX, J. f. Orn., 1868, p. 339.

1816.—*Anas cristata* LEACH, Syst. Cat. M. B. Br. Mus., p. 39 (*nec* GMEL. 1788).—*Fuligula c.* SWINH., Ibis, 1861, p. 345.—*Id., ibid.*, 1862, p. 254.—*Id., ibid.*, 1867, p. 399.—*Id.*, P. Z. S., 1863, p. 324.—PRZEW., Putesch. Ussur. (n. 209)(1870).—TACZAN., J. f. Orn., 1873, p. 110.—*Id., ibid.*, 1874, p. 337.—*Id.*, Orn. Faun. Vost. Sibir., p. 70 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 47.—*Id., ibid.*, 1883, p. 344.—BLAKIST, Ibis, 1887, p. 147.—*Id.*, Amend. List B. Jap., p. 9.—BLAKIST. & PRYER, Ibis, 1878, p. 214.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 186.—*Iid., ibid*, X, 1882, p. 99.—SEEB., Ibis, 1879, p. 22.—*Fulix c.* SWINH., P. Z. S., 1871, p. 419.

1826.—*Anas colymbis* PALL., Zoogr. Ross. As., II, p. 266.

Although not uncommon in Kamtschatka this duck is only of casual occurrence on Bering Island where a single pair was shot on the 7th of June, 1883, in Kamennij Valley, being in company with several *A. marila*. Only the male was fit for preservation. It is probable that another male was shot during my absence in Petropaulski, in the latter part of May.

The measurements are as follows:

The Scaup Duck of the region is in every particular identical with the common form inhabiting the Atlantic portion of the palæarctic continent, the true *A. marila*, from which is distinguishable a representative of the American *Aythya affinis* (EYTON), found in China and Japan, and entitled to recognition as *Aythya affinis mariloides* (VIG.). Nor must *A. marila* be confounded with its American subspecies *Aythya marila nearctica* STEJNEGER, which differs from the true *marila* in exactly the same manner as does *A. affinis* from *A. affinis mariloides*. The difference in size and in the light markings on the primaries is easily observable both in the males and the females. The males have the same additional distinguishing characters, and their differences may be tabulated thus:

a¹. Size smaller; reflections on head chiefly purple; flanks narrowly vermiculated with dusky.

b¹. Primaries from the fourth quill without whitish on the inner web, the latter being only a trifle paler than the rest of the quills.

1. *A. affinis* (EYTON).

Hab.—Nearctic Region, generally.

b². Primaries from the fourth with a distinct white area on the inner web.

1a. *A. affinis mariloides* (VIGORS).

Hab.—Pacific coast of Asia, from Japan southward.

a². Size larger; reflections on head green; Flanks uniform white without dusky vermiculations.

b¹. Primaries from the fourth quill with a distinct white area on the inner web.

2. *A. marila* (LIN.).

Hab.—Palæarctic Region, generally.

b². Primaries from the fourth quill with a grayish—but not white—area on the inner web.

2a. *A. marila nearctica* STEJNEGER.

Hab.—Nearctic Region. Specimens examined from Alaska, Pacific coast, Guatemala, Arctic and Atlantic coasts, and interior of the United States.

Quite extensive series have been examined and the characters found to hold good in every single instance. As will be seen, the Palæarctic forms agree in the pattern of the wing, having a quite pronounced white area on the inner webs of the inner primaries, a design only faintly marked in their American representatives, which have the corresponding area dull brownish gray.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Culmen.
					mm.	mm.	mm.	mm.
89111	1144	Bering Island	June 2, 1882	♂ ad.	465	211	55	
92842	1480	do	June 20, 1882	(♂) ad.	.....	212	55	
89101	1145	do	June 2, 1882	♀ ad.	436	200	54	
92843	1481	do	June 20, 1882	(♀) ad.	.....	204	52	
89100	1139	do	June 1, 1882	♀ ad.	436	215	56	
92844	1401	do	Aug. 5, 1882	pull.	218	.....	.....	
.....	1462	do	Aug. 5, 1882	pull.	290	.....	.....	.....

No. 89111.—Iris rich brown-yellow; bill clear bluish gray; nail and naked skin o black; feet dirty gray with a faint tinge of bluish; webs and soles blackish.

No. 89101.—As foregoing, but bill with a shade of brownish black on culmen, and tinctly bluish.

No. 92844.—Iris dirty yellow; bill dark bluish gray; lower mandible flesh-colored; a slight greenish tinge; webs blackish, yellowish along the toes.

The Scaup Duck is known to the natives by the Rus "*Tschernik*," being one of the most numerous ducks breed ring Island. They arrive in the beginning of May (in 1883 c and soon disperse over the island, taking up their reside numberless lakes, lakelets, and ponds. In the beginning of young are seen swimming with their parents.

The eggs measure as follows:

U. S. Nat. Mus. No.	L. Stejneger No.	Diameters.	Date.	Locality.	Rem
		mm.			
21793	1394	63 by 43	July 1882	Bering Island	
		66 by 43.5			
21792	1161	62.5 by 43	June 6, 1882	do	Full clutch.
		63 by 43			
		62 by 43			
		62 by 42			
		64 by 42			
		63.25 by 42.5			

73. Clangula clangula (LIN.).

1758.—*Anas clangula* LIN., Syst. Nat., 10 ed., I, p. 125.—PALL., Zoogr. Ross. As., II, p. 271 (1826).—TEMM. & SCHLEG., Faun. Jap. Av. (p. 128) (1849).—MIDDEND., Sibir. Reis., II, 2 (p. 287) (1853).—KITTL., Denkw., II, pp. 248, 278 (1858).—SCHRENCK, Reis. Amurl., I, p. 481 (1860).—RADDE, Reis. Süd. Ost-Sibir., II, p. 374 (1863).—*Fuligula c.* PRZEW., Putesch. Ussur. (n. 207) (1870).—*Bucephala c.* SWINH., P. Z. S., 1871, p. 419.—*Id.*, Ibis, 1877, p. 147.—*Glaucion c.* TACZAN., J. f. Orn., 1873, p. 110.—*Id.*, *ibid.*, 1874, p. 337.—*Id.*, Orn. Faun. Vost. Sibir., p. 71 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 47.—*Id.*, *ibid.*, 1883, p. 344.

1758.—*Anas glaucion* LIN., Syst. Nat., 10 ed., I, p. 126 (*nec* PALL.).—*Clangula g.* SWINH., Ibis, 1861, p. 345.—WHITELY, Ibis, 1867, p. 208.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 339.—BLAKIST. & PRYER, Ibis, 1878, p. 215.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 186.—*Id.*, *ibid*, X, 1882, p. 99.—BLAKIST., Amend. List B. Jap., p. 9 (1884).

1826.—*Anas hyemalis* PALL., Zoogr. Ross. As., II, p. 270 (*nec* LIN. 1758).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Expos. culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
92869	1762	Bering Island	Nov. 29, 1882	♂ jun	468	.....	202	83	33
92870	1771	.....do.....	Dec. 3, 1882	♀	400	29	194	68	33

No. 92869.—Iris light brownish-yellow. Bill olive black, above the nostrils lighter olive-gray. Feet yellowish-brown, joints and underside darker brownish; webs blackish-brown. In stomach only plenty of small stones.

No. 92870.—Bill olive-black, lighter olive-gray between nail and nostrils and on the culmen between the latter.

The "*Gogol*" of the Russians occurs in small numbers on Bering Island during the winter. They do not breed there, and the latest observed—three females and two males—were seen at Saranna Reschka on March 18, 1883. It was one of the most difficult ducks to approach, on account of its extreme shyness.

CHARITONETTA* n. gen.

(Type *Anas albeola* LIN.)

1758.—*Anas* LIN., Syst. Nat., 10, ed., I, p. 124.

1824.—*Clangula* STEPHENS, Gen. Zool., XII, pt. ii, p. 184.

1828.—*Fuligula* BONAP., Syn., p. 394.

1858.—*Bucephala* BAIRD, B. North Amer., p. 797 (type *A. albeola* LIN.) (nec *Bucephalus* BAER, 1827, qui *Verm.*, nec SMITH, 1829, qui *Rept.*, nec *Bucephalon* LESSON, 1836, quod *Acaleph.*).

* *Χάρις, χάριτος*, grace; *νῆττα, ἡ*, a duck.

Bill short, somewhat depressed; nostrils in the anterior portion of the posterior half of the bill, not pervious, rather narrow, and with an acute tubercle visible at the posterior corner, lamella not visible below tomia; border of frontal feathering angular. Outer toe without claw, decidedly longer than middle one; tip of inner toe, without claw, reaches only to the second joint of middle toe; hind toe very short. First primary longest; none of the primaries sinuated in the inner web. Tail rather long, more than twice the length of the tarsus; reaches beyond the folded wings by nearly twice the length of culmen, graduated, of 16 rectrices. Feathering of the head of the male particularly puffy.

The Buffle-head is as well entitled to generic rank as the other genera among the *Fuligulinæ*, differing, as it does, in many important structural features from the two species *Clangula glaucion* and *islandica*. The chief differences may by tabulated thus:

Charitonetta.	*Clangula.*
Nostrils behind the middle of the bill, being situated in the anterior portion of the posterior half.	Nostrils in front of the middle of the bill, being situated in the posterior portion of the anterior half.
Nostrils rather narrow and the tubercle visible.	Nostrils rather broad, tubercle not visible.
Lamellæ not at all visible below tomia.	Tips of lamellæ visible below tomia at the middle of the commissure.
Outer toe, without claw, decidedly longer than middle one.	Outer and middle toes of equal length.
Tip of inner toe, without claw, reaching only to the second joint of middle toe.	Tip of inner toe, without claw, reaching considerably beyond second joint of middle toe.
Tail rather long, more than twice the length of the tarsus, reaching beyond the folded wings by nearly twice the length of the culmen.	Tail rather short, not twice as long as the tarsus, reaching beyond the wings by less than the length of the culmen.

The above characters are taken from the birds when still in the flesh, and the accompanying figures, showing the difference in the bill of the two genera were drawn before the birds were skinned.

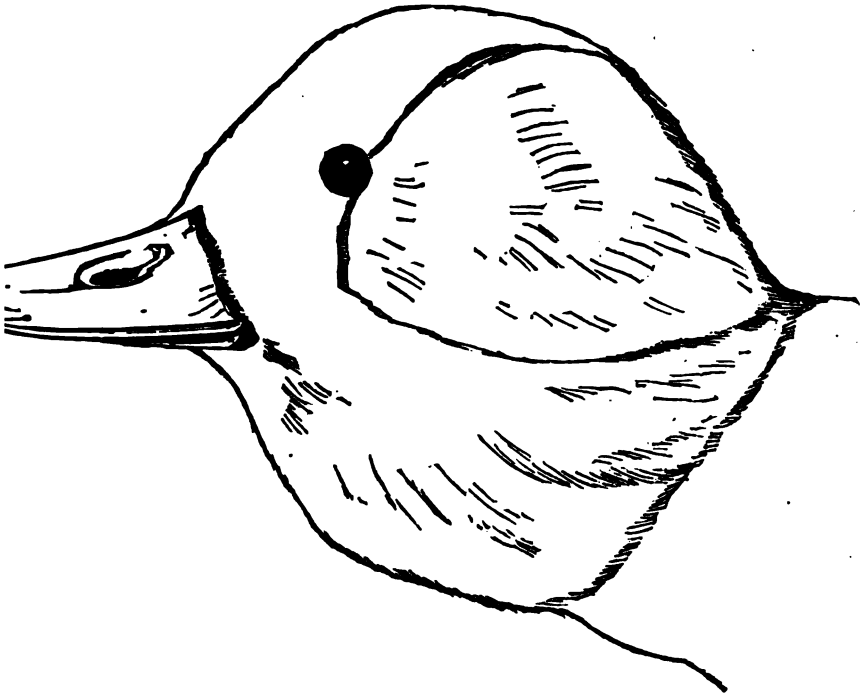


FIG. 6.—*Charitonetta albeola*, ♂ ad. Bering Island, January 19, 1883.

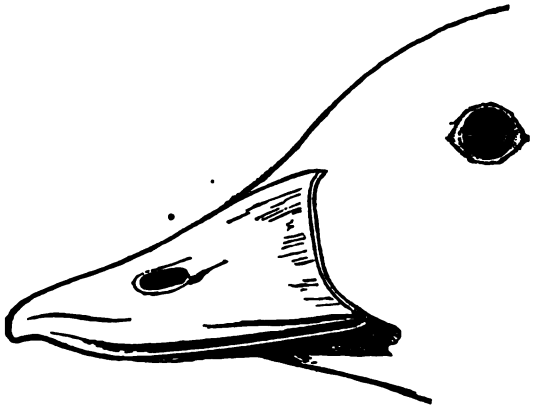


FIG. 7.—*Clangula clangula*, ♂ jun. Bering Island, November 20, 1882.

74. Charitonetta albeola (LIN.).

1758.—*Anas albeola* LIN., Syst. Nat., 10 ed., I, p. 124.—*Bucephala a.* DALL & Tr. Chicag. Acad., I, 1869, p. 298.—*Clangula a.* BEAN, Pr. U. S. 1882, p. 167.—HARTLAUB, J. f. Orn., 1883, p. 282.—TURNER, Au 158.

A beautiful male of this pretty species was obtained at Seve ing Island, on the 19th of January, 1883. It was in comp another male and a female of the same species. As the Buffl a strictly American bird, its appearance on the coast of the Cor Islands must be regarded as merely accidental. None of the ants had ever seen it.

This is the first recorded instance of this species ever hav met with in any part of Asia.

The dimensions of this specimen were as follows:

U. S. Nat. Mus. No. 92871; *L. Stejneger No.* 1873. ♂ *ad. Bering Island, J* 1883.

Total length, 372mm; tail beyond folded wings, 55mm; wing, 171mm; tai 76mm; graduation of tail, 27mm; bill from tip to frontal feathers on culn tarsus, 35mm; middle toe with claw, 59mm.

Remarks.—Iris dark brown. Bill bluish gray, lighter and somewhat ti yellow at tip, on culmen, along tomia, and round the nostrils, darker at b the naked skin of the chin-angle. Tongue light flesh-colored. Feet flesh-col a light tinge of violet-rosy; webs a little darker brownish, dirty-look black. Stomach contained gravel only. Very fat.

75. Histrionicus histrionicus (LIN.).

1758.—*Anas histrionica* LIN., Syst. Nat., 10 ed., I, p. 127.—PALL., Zoogr. Ro p. 273 (1826).—TEMM. and SCHLEG., Faun. Jap. Av., p. 129 (18 DEND., Sibir. Reis., II, 2, p. 537 (1853).—KITTL., Denkw., II, p. 34 SCHRENCK, Reis. Amurl., I, p. 483 (1860).—RADDE, Reis. Süd. Ost p. 374 (1863).—SWINH., P. Z. S., 1863, p. 324.—*Clangula h.* WHITELY, p. 208.—DYBOW. & PARVEX, Journ. f. Orn., 1868, p. 339.—BLA 1876, p. 335.—*Id.*, Amend. List B. Jap., p. 9 (1884).—SWINH., Ibi 147.—BLAKIST. and PRYER, Ibis, 1878, p. 215.—*Iid.*, Tr. As. Soc. J 1880, p. 186.—*Iid., ibid.*, X, 1882, p. 99.—SEEB., Ibis, 1879, p. 22.—H Orn., 1883, p. 283.—*Fuligula h.* PRZEW., Putesch. Ussur. (n. 208). *h.* FINSCH, Abh. Brem. Ver., III, 1872, p. 67.—TACZAN., J. f. Orn 110.—*Id., ibid.*, 1874, p. 337.—*Id., ibid.*, 1875, p. 257.—*Id.*, Orn. F Sibir., p. 71 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 47.— 1883, p. 344.—*Histrionicus h.* TURNER, Auk, 1885, p. 158.

1758.—*Anas minuta* LIN., Syst. Nat., 10 ed., I, p. 127.—*Histrionicus m.* NELS Corwin, p. 98 (1883).

1853.—*Anas histrionis* MIDDEND., Sibir. Reis., II, 2, pl. xxii.

1855.—*Clangula torquata* BREHM, Vogelf, p. 385.—*Histrionicus t.* BAIRD, T Acad., I, 1869 (p. 799).—DALL and BANNIST., Tr. Chicag. Acad., 289.—DALL, Avif. Aleut. Isl. Unal. eastw., p. 5 (1873).—COUES i Alask. Affairs, p. 191 (1875).—ELLIOTT, Monogr. Seal-Isl., p. 130 (

The above synonymy shows, at least partly, how this species l ced now in one, now in another genus, by those authors id of many genera, merely because they are many. Nothi

cates more plainly that the Harlequin Duck is misplaced in all of them, and *Histrionicus*, in fact, is one of the best marked genera in the whole group. Besides all the other characters, it has a peculiarity of its own, which at once distinguishes it from all others of its kind, the soft, naked membrane at the base of the upper mandible overlapping the tomium and concealing the corner of the mouth and the base of the lower mandible for a distance of not less than 9^{mm}.

This membrane shrinks considerably when the skin is prepared and dried. The true size and structure of the nostrils and many other parts of the bill are usually distorted in museum specimens. I, therefore, wrote down a synoptical comparison of the bills of *Histrionicus minutus* and *Harelda hyemalis*, with the fresh specimens before me, which I think it may be of some interest to reproduce; the notes are as follows:

Harelda.	*Histrionicus.*
Nail of upper mandible distinct, vaulted, narrower than the bill.	Nail of upper mandible indistinct, flat, occupying the whole breadth of the bill.
Tomia of upper mandible bent upwards toward the tip.	Tomia of upper mandible straight to the tip.
Lamellæ of upper mandible few, distant, and, in the hind part of the commissure, long, pendant, and visible below the tomium.	Lamellæ of upper mandible numerous, close together, and not visible below the tomium.
Edges of nostrils not swollen or raised above the surface of the bill.	Edges of nostrils swollen, raised above the surface of the bill.
Base of upper mandible without overhanging membrane.	Base of upper mandible with a soft, naked membrane overlapping the tomium.
Upper mandible of equal breadth to a point beyond the nostrils.	Upper mandible diminishing in breadth gradually from the base.
Frontal feathering proceeds farther on the bill, almost as far as the hind border of the nostrils, the mesial apex being rounded and the lateral border with a prominent but obtuse angle above, while concave below.	Frontal feathering does not proceed so far on the bill as the hind border of the nostrils; mesial apex pointed; loral border convex.
Lower mandible with a distinct "nail."	Lower mandible without distinct "nail."
Lamellæ of the lower jaw few, distant, and very prominent, distinctly visible outside of the tomia when viewed from below.	Lamellæ of lower jaw numerous, close together, and hardly perceptible outside of the tomia when viewed from below.
Lateral outlines of lower jaw, viewed from below, decidedly curved inward.	Lateral outlines of lower jaw, viewed from below, straight, converging gradually from the base.
Length of symphysis less than the breadth of the lower jaw at the hind border of the symphysis.	Length of symphysis greater than the breadth of the lower jaw at the hind border of the symphysis.
Feathering on mental angle pointed anteriorly.	Feathering on mental angle rounded anteriorly.
Distance from mental feathering to tip of lower jaw less than from the former to corner of mouth.	Distance from mental feathering to tip of lower jaw much greater than from the former to corner of mouth.

I have compared the birds collected by me, and numerous specimens from Alaska, with birds obtained from the Atlantic shores, without finding any tangible difference.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.
89110	1059	Bering Island	May 18, 1882	♂ ad.	434	200	98	28	40	58
92862	1738	....do	Nov. 18, 1882	♂ ad.	439	203	104	29	39	60
92860	1750	....do	Nov. 25, 1882	♂ ad.	446	196	95	26	40	.....
92859	1878	....do	Jan. 20, 1883	♂ ad.	425	197	87	27	38	.....
92861	1958	....do	March 22, 1883	♂ ad.	438	198	100	27	39	.....
92863	1739	....do	Nov. 18, 1882	♂ jun.	412	183	73	27	39	.....

No. 89110.—Iris dark hazel. Bill, bluish gray; tip lighter, with a yellowish wash all over; naked skin of mental angle, violet black. Feet brownish gray; joints darker; webs blackish.

No. 92862.—Iris dark hazel. Bill bluish white, tinged with yellowish, becoming dark, bluish gray behind the middle of the nostrils. Feet grayish brown; joints darker; webs blackish. In the crop a *Cottus*, 50^{mm} long, a small crab and two *Littorinæ*.

No. 92861.—Iris dark hazel. Bill in front of nostrils, as also the swollen border of the latter, light bluish gray, basal part dark olive gray; nail hardly appreciable (except to the touch, as it is hard while the rest of the bill soft), 14^{mm} long, and faintly tinged with yellowish; chin-angle blackish. Feet grayish brown; webs and below blackish.

No. 92863.—Iris dark hazel. Bill dark bluish gray; toma and borders of nostrils lighter; chin-angle black. Feet light-yellowish gray, with darker joints; tarsus behind, webs, and below, blackish.

The color of the soft parts of the adult No. 92862 and the young No. 92863, both males, and shot on the same date, is noteworthy.

The "*Kamenuschka*," as the Harlequin Duck is styled on the islands, inhabits the rocky shores of the Commander Islands in large numbers all the year round, and larger or smaller flocks may almost at any time be seen diving and swimming near the breakers where the high and inaccessible promontories tower up from the sea, or long, shallow, and stony reefs stretch out from the shore for a quarter of a mile and more. It loves the surf and rocks, and is perhaps more expert in diving "at shot" than any other duck, not being particularly shy, however.

I watched their large assemblages during the whole spring of 1883, and noted solid flocks at Bering Island as late as the middle of June, and on Copper Island, on July 1, the latter, however, consisting of adult males, all in their most beautiful plumage. Nevertheless, it is not found breeding on the islands. The natives or residents knew of no instance of its eggs or small young having ever been taken or seen; nor did I suc-

ceed in finding any evidence of its breeding; so that I have little doubt that the numerous flocks which remain over summer consist of birds not propagating during that season, for some reason or another. It is also probable that the flocks observed on July 1, and later, exclusively consisting of males in full adult plumage, are composed of adult males having already left the females and young on the breeding haunts, which I suspect to be the interior mountainous parts of Kamtschatka. It is probably the occurrence during the breeding season of similar flocks which has given rise to the supposition of the breeding of birds, like *Eniconetta stelleri* and *Somateria spectabilis*, in the latitudes of Kamtschatka and the Aleutian chain.

76. Harelda hyemalis (LIN.).

1758.—*Anas hyemalis* LIN., Syst. Nat., 10 ed., I, p. 126 (*nec* PALL.).—*Harelda h.* TURNER, Auk, 1885, p. 158.

1766.—*Anas glacialis* LIN., Syst. Nat., 12 ed., I, p. 203.—PALL., Zoogr. Ross. As., II, p. 276 (1826).—MIDDEND., Sibir. Reis., II, 2, p. 236 (1853).—RADDE, Reis. Süd. Ost- Sibir., II (p. 374) (1863).—*Harelda g.* SWINH., P. Z. S., 1863, p. 324.—*Id.*, *ibid.*, 1871, p. 419.—*Id.*, Ibis, 1877, p. 147.—WHITELY, Ibis, 1867, p. 208.—DALL and BANNIST., Tr. Chic. Acad., I, 1869, p. 298.—BAIRD, Tr. Chic. Acad., I, 1869, p. 800.—FINSCH, Abh. Brem. Ver., III, 1872, p. 67.—DALL, Avif. Aleut. Isl. Unal. eastw. p. 5 (1873).—*Id.*, Avif. Aleut. Isl. west Unal. p. 7 (1874).—COUES, in Elliott's Affairs Alaska, p. 191 (1875).—TACZAN., J. f. Orn., 1876, p. 202.—*Id.*, Orn. Faun. Vost. Sibir., p. 71 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 48.—*Id.*, *ibid*, 1883, p. 344.—BLAKIST. and PRYER, Ibis, 1878, p. 214.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 186.—*Id.*, *ibid.*, X, 1882, p. 100.—SEEB., Ibis, 1879, p. 23.—ELLIOTT, Monogr. Seal-Isl., p. 130 (1882).—NELSON, Cruise Corwin, p. 99 (1883).—HARTL., J. f. Orn., 1883, p. 282.—BLAKIST., Amend. List Birds Jap., p. 20 (1884).

As the changes of the different plumages of this species are now very well known, no further remarks are here required. I may mention, however, that the males commenced assuming their dark nuptial plumage about the middle of April, most of them being in full change in the latter part of this month. The time varies a great deal in different individuals, so that while two males shot on the 2d and 3d of June were in full nuptial plumage, another shot three days later had not passed through more than half the change.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	mm.	mm.	mm.	mm.	mm.
89113	1143	Bering Island	June 2, 1882	♂ ad.	*422+111	214	204	28	33	.....
89114	1149	....do	June 3, 1882	♂ ad.	*428+88	209	193	26	31	55
89115	1166	....do	June 6, 1882	♂ ad.	.....	225	203	27	36	53
92864	1773	....do	Dec. 16, 1882	♂ ad.	*460+91	214	220	28	35	.....
92865	1879	....do	Jan. 22, 1883	♂ ad.	*445+89	216	187	27	35	.....
89116	1113	....do	May 29, 1882	♀ ad.	382	199	61	25	34	54
92866	1749	....do	Nov. 26, 1882	♀	387	188	56	26	32	52
92867	1413	....do	Aug. 7, 1882	pull.	245	.....	.....	18	27	35
92868	2332	....do	July 9, 1883	pull.	.....	.....	.....	11	17	28

* From tip of bill to tip of tail-feathers next to the middle pair + the length of the latter beyond the others.

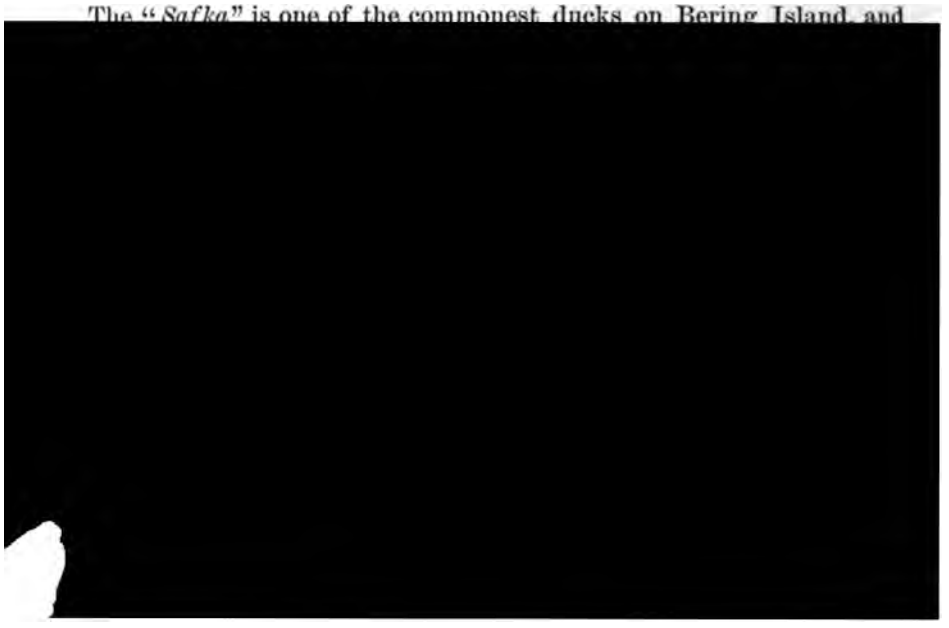
No. 89113.—Iris light yellowish hazel. Bill bluish black with a broad, angulate band behind the nail of a rosy flesh-color shaded with bluish toward the nail and on the culmen; on the lower mandible the nail is more bluish and the rosy band more orange. Feet light bluish white; joints darker bluish gray; sole, webs, and nails blackish.

No. 92864.—Iris light hazel. Bill black with the rosy band fading into light flesh-color on the lower mandible. Feet pure bluish white; joints dark bluish gray; sole and webs blackish. Tips of closed wing reach tips of shorter tail-feathers; toes, stretched backwards, reach end of longest *white* tail feathers. Outer toe longer than middle one; inner toe, without claw, reaches second joint of middle toe.

No. 98116.—Iris light yellowish hazel. Bill bluish gray, darker towards the tip; nail blackish; naked skin of mental angle dirty flesh-color. Anterior side of tarsus, toes, and webs along the toes bluish white; posterior surface of tarsus, joints, webs, and under side of toes blackish. In the aviduct was an egg 55^{mm} long. Two largest eggs of the ovary measured 32 and 25^{mm}.

No. 92867.—Iris dark brown. Bill dark gray, with greenish tinge. Feet light bluish gray, with yellowish tinge; darker on tarsus and joints; webs blackish.

The "*Safka*" is one of the commonest ducks on Bering Island, and



1766.—*Anas dispar* SPARRMANN, Mus. Carlson. (tbb. 7 and 8).—*Sometcria dispar* BLAKIST., Ibis, 1876, p. 315.—*Id.*, Amend. List B. Jap., p. 29 (1884).—BLAKIST. and PRYER, Ibis, 1878, p. 215.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 187.—*Id.*, *ibid.*, X, 1882, p. 100.

The bill of this species is very peculiar, and would alone justify its separation as the type of a distinct genus. Especially characteristic are the soft lobes formed by the tomia of the upper mandible in their anterior half. When dried they roll up so as to inclose the lower mandible and become hard, the lateral outline thereby being considerably changed, becoming unduly narrowed towards the tip.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92854	1790	Bering Island.....	Dec. 10, 1882	♂ ad.	435	.....	205	90	37	38	.....
92852	1797	.....do.....	Dec. 13, 1882	♂ ad.	445	.....	213	94	36	41	63
92855	1798	.....do.....	Dec. 13, 1882	♂ ad.	455	.....	219	95	38	40	61
92853	1933	.....do.....	Mar. 4,1883	♂ ad.	462	.....	221	87	37	39	59
92851	1963	.....do.....	Apr. 2, 1883	♂ ad.	440	44	209	88	38	40	.....
92857	1740	.....do.....	Nov. 20, 1882	♂ jun.	392	.....	189	69	37	38	.....
92856	1746	.....do.....	Nov. 24, 1882	♂ jun.	432	.....	198	74	36	39	57
92858	2003	.....do.....	Apr. 25, 1883	♀ ad.	450	42	208	80	38	40	.....

No. 92854.—Iris dark brown. Bill, light bluish gray; nail somewhat yellowish; skin of mental angle light as the bill. Feet gray, with a tinge rather brownish than bluish; joints and tarsus behind darker; webs blackish.

No. 92851.—Iris dark brown. Bill, light bluish gray; naked mental angle, hardly darker toward the feathering. Feet brownish gray; webs and below blackish. The crop contained green Algæ, four different species of Mollusks, at least six species of Amphipods, and one *Idotæa*.

No. 92857.—Iris dark brown. Bill, grayish blue, as is also the naked space of the mental angle. Feet of a brownish pearl-gray, darker on the joints and behind; webs blackish. New feathers in their sheaths, especially in the head, in the armpits, and on the rump.

No. 92856.—Like foregoing, only feet pure gray without any brownish tinge. New feathers on head, breast, and scapular region.

No. 92858.—New feathers in their sheaths all over the body. Extremely fat.

Nothing special is to be remarked about the plumage and the color of the specimens enumerated above, except that a narrow whitish spot is found in two of the old males on the outmost pair of rectrices, near their tip, while wanting in the other specimens (cf. also Keyserling and Blasius, Wirbelth. Europ., p. 230, and Naumann, Naturgesch. Vög. Deutschl., XII, p. 247). Another noteworthy feature is that in No. 92853, an adult male, the first primary in the left wing has the greater part of the inner web pure white, while some of the inner primaries and the hand-coverts likewise show signs of partial albinismus.

Steller's Duck made its appearance in 1882, about the 1st of November, at which time large flocks were observed, but no specimen was secured before the 20th, although several were shot, because the current would carry them away. They remained all winter round the coast, preferring the rockiest parts and the places where the breakers were most violent. Although very numerous during the whole winter, in spring their number was enormously increased, and immense flocks, covering many acres, could be seen floating on the sea, a quarter to a half of a mile off the shore, during April. The favorite places at that time were Tonkij Mys on the western coast, and the whole line of reefs from Staraja Gavan to Tolstoj Mys on the eastern side. Towards the end of this month their number decreased considerably, and I find among my notes that on the 20th of April, and the 2d, 4th, and 5th of May only a few were seen. On the 8th, half a dozen males and females were observed at Toporkoff Islet, but on the 10th large flocks were again met with between Kamennij Reschka and Tonkij Mys. They disappeared altogether about the 25th of May.

Prof. W. H. Dall, in a very important paper on the Avifauna of the Aleutian Islands, from Unalaschka eastward (p. 6), speaks of this bird as a resident and breeding bird of the Aleutian Islands, and more especially of Unalaschka. I cannot help thinking, however, that there is some mistake concerning the identification of the species. It is altogether improbable that this bird, which is known as a breeding bird from very high Arctic latitudes, should rear its young on the eastern Aleutian Islands. If the egg found on the 18th of May, 1872, really belonged to this species, the occurrence can only be regarded as a very anomalous one. I am not aware that later observations corroborate Professor Dall's statement.

During its stay at Bering Island, Steller's Duck is, next to *Clangula glaucion*, the shyest bird of the whole duck tribe. Usually the adult males keep apart from the females and the younger males, and their flocks are almost always farther out at sea than those of the latter.

As to the change of plumage in this species I have only a few remarks to offer. The young males in November had not yet all the new feathers of their first winter plumage fully developed. At the end of April the females were in full moult, while the males were not, and among the many thousands not a single young male was observed at that time to show a trace of a new white plumage.

78. Somateria v-nigra GRAY.

1769.—*Anas mollissima* PALLAS, Spicil. Zool., V, p. 28 (*nec* LIN.).—*Somateria m.* TACZAN., Orn. Faun. Vost. Sibir., p. 71 (*part*) (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 48.—*Id.*, *ibid.*, 1883, p. 398.

1826.—*Somateria cuthberti* PALL., Zoogr. Ross. As., II, p. 235 (*part*).

1855.—*Somateria v-nigra* GRAY, P. Z. S., 1855, p. 212, pl. cvii.—DALL and BANNIST., Tr. Chicag. Acad., I, 1869, p. 300.—DALL, Avif. Aleut. Isl. Unal. westw., p. 7 (1874).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 167.—NELSON, Cruise Corwin, p. 101 (1883).—TURNER, Auk, 1885, p. 158.

1856.—*Somateria v-nigrum* BONAP., Compt. Rend., XLIII, 1856, p. 650.—STEJNEGER, Naturen, 1884, p. 51.

The only adult male I obtained was shot on the 3d of July, being still in its white and elegant breeding dress. But under the white feathers the brown post-nuptial plumage, which is only assumed for a very short time, had already made its appearance, and a few of the dark feathers were so far out as to show themselves between the white ones on the back, although still partly in their sheaths. It would therefore seem as if the Pacific Eider assumes its post-nuptial plumage somewhat later than its Atlantic cousin, of which old males, with the dark plumage almost fully developed, are known from various parts of Scandinavia as early as the latter part of June, notwithstanding that the breeding of the two species takes place at exactly the same time.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Middle toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92848	2223	Copper Island.....	July 3, 1883	♂ ad.	623	55	304	94	55	52	80
92847	2200	....do.....	June 15, 1883	(♂) ad.	.....	.....	302	94	49	51	.....
92850	2289	... do.....	July 25, 1883	pull.	236	.....	.....	.....	22	28	33

No. 92848.—Iris dark brown. Bill bright and pure orange, deeper brownish-red orange towards the base; lower mandible paler; nail cream-colored. Feet pale brownish orange; joints dusky; webs blackish brown. New (brown) feathers in their sheaths on different parts of the body, on the sides of the rump, shoulder region, and especially neck and head. Weight, 4¼ pounds.

No. 92850.—Iris blackish brown. Bill plumbeous, with an olive tinge; nail horny yellow. Feet very dark yellowish gray; webs blackish. Gullet filled with *Gammaridæ*.

The Pacific Eider is now rather scarce on the Commander Islands. On Copper Island there are only a few places where it at present breeds, in very restricted numbers, namely, at Gladkovskij and at another creek nearer to Karabelnij. From there I got a male in perfect plumage, a fe-

male, a downy chick, and an egg. On Bering Island it does not occur at all, except as a rare visitor during the winter. Taczanowski, it is true, asserts (Bull. Soc. Zool. France, 1882, p. 398) that he has received a female and eggs from Bering Island, but this certainly is a mistake, as the bird and eggs, in all probability, are from the place, mentioned above, on Copper Island. I need not mention to anybody familiar with the water birds that his determination of the bird as *S. mollissima* is entirely wrong. This species, of course, does not at all occur in the North Pacific. I repeat that the Eider does not breed now on Bering Island, and has not bred there within the memory of the present inhabitants. The "*Pistrak*" was well known to the Copper-Islanders, who considered it a great delicacy, while only a few of the men on Bering Island had ever seen it. The only one I myself observed, while on Bering Island, was a white male near Zapadnij on the 9th of March, 1883.

The downy young is in every particular a counterpart of the chick of *S. mollissima* of the corresponding age.

The only egg procured (No. 2,210, U. S. Nat. Mus. No. 21,782) measures 70 by 48 millimeters.

79. Oidemia americana Sw. & Rich.

1814.—*Anas nigra* Wilson, Am. Orn. VIII (p. 135, pl. 72) (*nec* Lin.).
1831.—*Oidemia americana* Sw. & Rich., Faun. Bor. Am., II, p. 450.—Dall & Bann., Tr. Chic. Ac. Sc., I, 1869, p. 300.—Finsch, Abh. Brem. Ver., III, 1872, p. 68.—Dall, Avif. Aleut. Isl. Unal. eastw., p. 6, (1873).—Blakist. & Pryer, Ibis, 1878, p. 215.—*Id.*, T. A. S. J., VIII, 1880, p. 187.—*Id.*, *ibid.*, X, 1882, p. 100.—Seebohm, Ibis, 1879, p. 23.—Taczanowski, Bull. Soc. Zool. France, 1883, p. 344.—Nelson, Cruise Corwin, p. 102 (1883).—Blakist., Amend. List B. Jap., p. 9 (1884).—Turner, Auk, 1885, p. 158.

During winter this species occurs at the islands, but sparingly, and usually at sea far from the shore. I was therefore unable to procure a specimen, but identified the species beyond question by means of my binocular. The yellow knob at the base of the bill could not be mistaken; it was not *nigra*.

80. Oidemia deglandii Bp.

1814.—*Anas fusca* Wilson, Am. Orn., VIII, (p. 137, pl. 72) (*nec* Lin.).—Kittl., Denkw., I, p. 260 (1858).—*Melanetta f.* Nelson, Cruise Corwin, p. 102.
1850.—*Oidemia deglandii* Bonaparte, Rev. Crit. Degland (p. 108).
1852.—*Oidemia velvetina* Cassin, Tr. Phil. Ac., V, 1850–'51, p. 126.—Finsch, Abh. Brem. Ver., III, 1872, p. 68.—Swinh., Ibis, 1875 p. 457.—Blakist. & Pryer, Tr. As. Soc. Jap., X, 1882, p. 100.—*Melanetta* r. Dall & Bann., Tr. Chic. Ac., I, 1869, p. 300.—Dall, Avif. Aleut. Isl., Unal. eastw., p. 6 (1873).
1863.—*Œdemia americana* Swinhoe, Ibis, 1863, p 435 (*nec* Sw. & Rich.).—*Id.*, P. Z. S., 1871, p. 419.

The systematic name by which this species is most commonly known is *Oidemia* (or *Melanetta*) *velvetina* Cassin, "1850." Bonaparte's *O. deglandii* was published the same year, and ornithologists deciding the priority by the number of the page must accept the latter name. But other authors will also be compelled to accept it, as Cassin's name was not published before 1851, for his paper was first read before the Academy of Sciences at Philadelphia on December the 24th, and on the last day of that year the committee reported in favor of its publication in the Proceedings (*cf.* Phil. Ac. Sc. Proc., V, 1850–'51, pp. 123 and 126), consequently, the publication can not have taken place in 1850, and may not have been effected before 1852, since the title page of the fifth volume is dated from the latter year.

The only bird obtained by me was a young male of the year, closely agreeing in every respect with a specimen from Shanghai in the U. S. National Museum, and both have the only reliable character by which young and females of this species, *O. deglandii*, can be distinguished from those of the true *O. fusca*, viz, the shorter distance between the lateral feathering of the lores and the nostrils, it being 5^{mm} or less in the former against 6^{mm} or more in the latter. Through the courtesy of Governor Grebnitski, I received this year two old males in splendid plumage, obtained at Bering Island in March and April, 1884, showing the distinctive characters of *O. deglandii* in their greatest development. The distance alluded to above is quite within the given limit; the lateral swelling of the naked part of the maxilla beneath and behind the nostrils, so noticeable in *fusca*, is here absent, and the knob shows a development which may be regarded as excessive even in *O. deglandii*, so much so that it is protracted anteriorly into a kind of a horn overhanging the culmen. In fact, the National Museum, which possesses quite a series of this species, has no specimen which, in that respect, can even be said to approach the two Bering Island birds, which are entirely alike.

The regular occurrence of *O. deglandii* on the Pacific coasts of the Old World may thus be regarded as established beyond the slightest doubt. There seems, however, to be good reasons for also admitting the true *fusca* as an inhabitant of the eastern shores of Asia, the probability then being that the latter occurs more to the northward and along the western shore of the Okotsk Sea to China, while *O. deglandii* reaches from Alaska across the Aleutian chain to Kamtschatka, the Kuriles, and Japan, where it winters and meets *O. fusca* proper, sometimes even traveling as far as China, while, on the other hand, a stray individual of *fusca* occasionally finds its way to Alaska.

The East Asiatic bird has universally and indiscriminately been istered as *O. fusca*. Just how many of these references really be to it and how many to *deglandii* is difficult to say. I have, there given the chief quotations in the foot-note.*

List of specimens.

U. S. Nat. Mus. No.	Collector's No.	Locality.	Date.	Sex and age.	Wing.	Tail.	Culmen.	From hind border of nostrils to loral feathering.	Tarsus.
92,847	1692	Bering Island.....	Oct. 23, 1882	♂ juv.	237	68	39	.....	47
101,205	G. 78	.....do	March, 1884	(♂) ad.	275	90	46	5	47
101,206	G. 79	.....do	April, 1884	(♂) ad.	.....	80	44	4.5	46

No. 92847.—Iris dark brown. Bill blackish gray. Feet reddish gray; tarsus behind and more grayish; webs more blackish. In stomach only small stones.

The "*Turpan*" is not a common winter visitor to the islands, it b mostly seen in fall and spring, and then mostly too far from the s to be easily secured.

81. Merganser merganser (Lin.).

1758.—*Mergus merganser* Lin., Syst. Nat., 10 ed., I, p. 129.—Pall., Zoogr. Ross. A II, p. 286 (1826).—Temm. and Schleg., Faun. Jap. Av. (p. —) (18 Middend., Sibir. Reise, II, 2, p. 238 (1853).—Kittl., Denkw., II, 1 (1858).—Schrenck, Reis. Amurl., I, p. 485 (1860).—Swinh., Ibis, 18 344.—*Id.*, P. Z. S., 1863, p. 323.—Radde, Reis. Süd. Ost-Sibir., II (p (1863).—Przew., Putesch. Ussur. (n. 212) (1870).—Taczan., J. f. Orn., p. 110.—*Id.*, Orn. Faun. Vost. Sibir., p. 72 (1877).—*Id.*, Bull. Soc. France, 1877, p. 48.—*Id.*, *ibid.*, 1883, p. 345.

1766.—*Mergus castor* Lin., Syst. Nat., 12 ed., I, p. 209.—Swinh, P. Z. S., 1871, p. *Id.*, Ibis, 1875, p. 456.—Blakist. & Pryer, Ibis, 1878, p. 215.—*Id.*, T Soc. Jap., VIII, 1880, p. 187.—*Id.*, *ibid.*, X, 1881, p. 101.—Blakist., A List B. Jap., p. 9 (1884).

The Goosander from Kamtschatka and Bering Island, the "*Bol Krachal*" of the inhabitants, is the true *merganser*, indistinguish from the bird occurring in the western portion of the Palæarctic re

Anas fusca Lin., Syst. Nat., 10 ed., I, p. 123 (1758.)—*Oidemia f.* Swinh., P. Z. S., p, 324.—*Id.*, *ibid.*, 1871, p, 419.—*Id.*, Ibis, 1875, p. 457.—Whitely, Ibis, p. 208.—Finsch, Abh. Brem. Ver., III, 1872, p. 69.—Taczan., J. f. Orn., p. 110.—*Id.*, Orn. Faun. Vost. Sibir., p. 71 (1877).—*Id.*, Bull. Soc. 1877, p. 48.—Blakist. & Pryer, Ibis, 1878, p. 215.—*Id.*, Tr. As. Soc. VIII, 1880, p. 187.—*Id.*, *ibid.*, X, 1882, p. 100.—Blakist., Chrysanth., p. 27.—*Id.*, Amend. List B. Jap., p. 9 (1884).—*Anas carbo* Pallas, Z Ross. As., II, p. 244 (1826).—Middend., Sibir. Reise, II, 2 (p. 236) (18 Radde, Reis. Süd. Ost-Sibir, II (p. 373) (1863).

From the American form, the occurrence of which on the mainland of Alaska along the Bering Sea has not yet been reported,* it differs not only in lacking the black stripe dividing the white wing-speculum, but the border line of the feathering on the bill is so differently arranged in the two forms, and so constant, that the appellation of *Merganser merganser americanus* is not defensible.

In order to make these differences better understood, I tabulate them as follows:

Merganser americanus.	*Merganser merganser.*
(1) The distance from the loral apex to the angle of mouth is equal to *half* the distance from the loral apex to the posterior corner of the nostrils;	(1) The distance from the loral apex to the angle of mouth is equal to or longer than the *whole* distance from the loral apex to the posterior corner of the nostrils;
(2) The distance from the loral apex to the *posterior* corner of the nostrils is	(2) The distance from the loral apex to the *posterior* corner of the nostrils is
(*a*) about equal to half the distance from the *anterior* corner of the nostrils to the tip of the bill,	(*a*) about equal to one-third the distance from the *anterior* corner of the nostrils to the tip of the bill,
(*b*) and considerably longer than the distance from the loral apex to the tip of the naked frontal angle;	(*b*) and shorter or equal to the distance from the loral apex to the tip of the naked frontal angle;
(3) The distance from the frontal apex to the posterior corner of the nostrils is shorter than the distance from the loral apex to the same point.	(3) The distance from the frontal apex to the posterior corner of the nostrils is equal to the distance from the loral apex to the same point.
(4) Wing-speculum white, divided by a transverse black bar.	(4) Wing-speculum white, undivided.

This species is rather common in Kamtschatka, but being more an inland bird than *M. serrator* it occurs on Bering Island in limited numbers only.

In 1883 the first new-comers—the species does not winter on the islands—were observed on April 15.

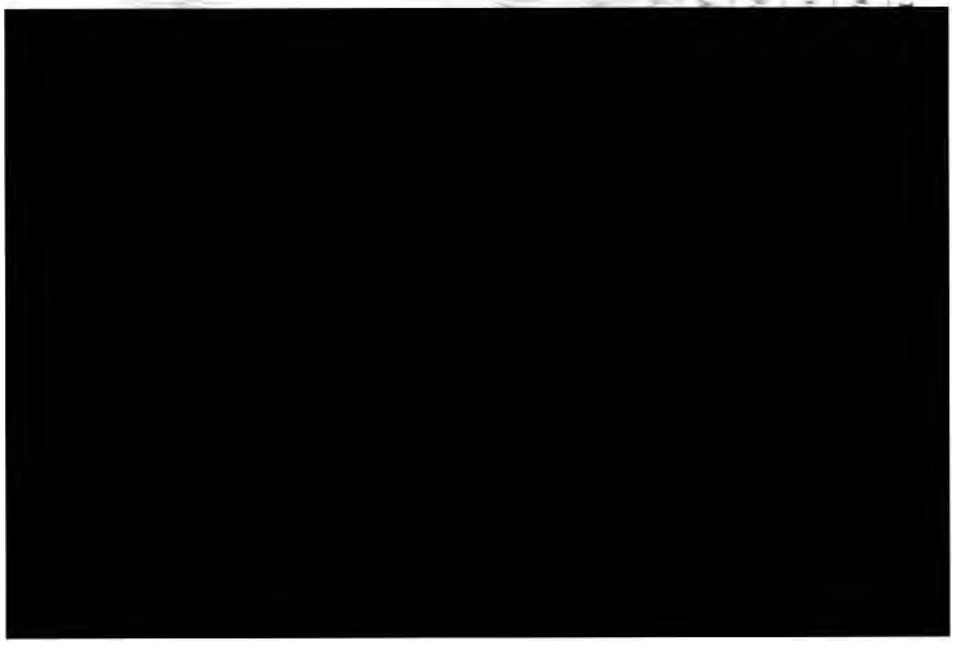
A male (*U. S. Nat. Mus. No.* 92872; *L. Stejneger No.* 2027) shot on Bering Island, May 17, 1883, measures as follows: Total length (654)^{mm}. Wing, 297^{mm}; tail-feathers, 110^{mm}; culmen, 55^{mm}; tarsus, 52^{mm}. Middle toe with claw.

*It has been obtained at Alexandrovsk, Kenay (Finsch); Ft. Yukon, Sitka, Unalaschka (Dall); Kodiak (Bean); Chilcoot (Hartlaub).

...IX.

...ALL., Zoogr. Ross. As., I, p. ... 1853).—SCHRENCK, Reis. ... p. 322.—*Id.*, Amend. List ... (1863).— ... 416.—*Id.*, Ibis. 1875, p. ... 25.—BAIRD, Pr. Chic. Acad., ... 1869, p 301.—PRZEW., ... Mem. Ver., III. 1872, p. 72.— ... 57.—*Id.*, Orn. Faun. ... 1877, p. 49.—*Id.*, *ibid.*, ... 1874.—BLAKIST ... VIII. 1880, p. 187.— ... 1878, p. 283.—NELSON, ... NELL. Bull. 1880, p. 172. ... 1880, p. 67.—*Id.*,

...s. ...is a very common breed- ...ing on all suitable lakes and ... upper Island it is rare, for ... wever, in a few places, thus, ... the village.



PRZEW., Putesch. Ussur. (n. 214) (1870).—TACZAN., J. f. Orn., 1874, p. 337.—*Id.*, Orn. Faun. Vost. Sibir., p.72 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 49.—*Id.*, *ibid.*, 1883, p. 345.—SEEB., Ibis, 1879, p. 23.—*Mergellus a.* SWINH., P. Z. S., 1871, p. 416.—TACZAN., J. f. Orn., 1873, p. 111.—BLAKIST. & PRYER, Ibis, 1878, p. 215.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 187.—*Id.*, *ibid.*, X, 1882, p. 101.—BLAKIST., Amend. List B. Jap., p. 9 (1884).

The Smew is only a visitor to Bering Island during the spring migration, but is not a regular one. A pair was shot there during the abnormal spring of 1883, abnormal, at least, as far as ornithology is concerned. Another pair was sent me this year by Governor Grebnitski, and a remark on one of the labels indicates that the Smew was rather numerous during the spring of 1884.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Culmen.	Tarsus.	Mid. toe with claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92875	2028	Bering Island	May 20, 1883.	(♂) ad.	(494)	190	74	29	32	55
101213	G. 85	do	May 8, 1884.	(♂) ad.	.....	187	78	30	34	56
92876	2029	do	May 20, 1883.	(♀) ad.	(390)	177	71	26	32	50
101212	G. 83	do	May, —1884.	(♀) ad.	.....	172	67	27	30	48

ORDER STEGANOPODES.

Superfamily PHALACROCORACOIDEÆ.

FAMILY PHALACROCORACIDÆ.

84. Phalacrocorax perspicillatus PALL.

1826.—*Phalacrocorax perspicillatus* PALL., Zoogr. Ross. As., II, p. 305.—GOULD, Zool. Sulphur, p. 49, pl. xxxii (1844).—TACZAN., Orn. Faun. Vost. Sibir., p. 66 (1877).—*Id.*, Bull. Soc. Zool. France, 1877, p. 41.—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 65.

1850.—*Graculus urile* REICHENB., Natat. Novit., pl xvii, figs. 2311 and 2312 (*nec* GMEL.) (Cf. BONAP., Consp. Av., I, p. 168, and A. B. MEYER, Index Reichenb., p. 44; no name on the plate!)

When Steller was wrecked on Bering Island in 1741 he found this species very numerous.*

It has now been totally exterminated on the island, and I have nothing to add to what I have said in my preliminary report concerning this species (Pr. U. S. Nat. Mus., 1883, p. 65): "It is not to be doubted that the *Phalacrocorax perspicillatus* does not occur on the islands at present. The natives, however, remember very well the time when it was plenti-

bility that it may still be found on some uninhabited, never or seldom visited, rock or island of the Aleutian chain, but it is altogether improbable that it should have escaped detection by such energetic and successful travelers as Prof. W. H. Dall, Mr. L. M. Turner, and the other gentlemen who have collected in that region.

I myself have no doubt that we have to register the Spectacled or Pallas's Cormorant in the same category as the Great Auk (*Plautus impennis*) and the Labrador Duck (*Camptolaimus labradorius*), to which, before long, several other species will have to be added.

85. Phalacrocorax urile (GMEL.).

1788.—*Pelecanus urile* GMEL., Syst. Nat., I, p. 575.—*Carbo* (*Pelecanus*) *urile* KITTL., Isis 1832, p. 1104.

1788.—?? *Pelecanus violaceus* GMEL, Syst. Nat., p. 575 (*nec* LAWR., 1858).—*Phalacrocorax v.* TACZAN., Bull. Soc. Zool. France, 1883, p. 341.

1836.—*Phalacrocorax bicristatus* PALL., Zoogr. Ross. As., II, p. 301 (*nec* TEMM. & SCHLEG., qui *pelagicus*).—KITTL., Denkw., II, p. 224 (1858).—*Id.*, J. f. Orn., 1858, p. 389.—SWINH., Ibis, 1874, p. 164.—BLAKIST. and PRYER, Tr. As. Soc. Jap., X, 1882, p. 102.—NELSON, Cruise Corwin, p. 103 (1883).—BLAKIST., Amend. List B. Jap., p. 10 (1884).—*Graculus b.* BAIRD, Tr. Chic. Acad., I, 1869 (p. 321, pl. 33).—DALL & BANNIST., Tr. Chic. Acad., I., 1869, p. 302.—FINSCH, Abh. Brem. Ver., III, 1872, p. 86.—DALL, Avif. Aleut. Isl. west Unal., p. 7 (1874).—COUES, in Elliott's Affairs Alaska, p. 192 (1875).

1860.—*Carbo pelagicus* COINDE, Rev. Mag. Zool., 1860, p. 401.

The name of the present species has been involved in great uncertainty and confusion. Some authors have called it *Ph. violaceus* (GMEL.), a name which, by the American ornithologists, almost unanimously has been referred to what Pallas called *Ph. pelagicus*. The latter have mostly used the appellation *bicristatus* PALL., which, on the other hand, by the authors of Fauna Japonica and many of their followers has been misapplied to *pelagicus*, while *urile* GMEL. was doubtfully referred to the present species or to *perspicillatus* PALLAS, or to both.

This uncertainty as to the proper location of Gmelin's *urile* has arisen from a slip of the pen on the side of the author of the "Arctic Zoology," which, like many other elephants, was swallowed whole by Gmelin.

Gmelin's *Pelecanus urile* is based entirely and solely upon the "Red-faced Corvorant, *Arct. Zool.*, 2, p. 584, C.; Red-faced Shag, *Lath. syn.*, III, 2, p. 601, n. 17; urile, *Steller Camtschatc.*, p. 157," the latter quotation evidently being referable to James Grieve's English edition of Krascheninnikoff's "The History of Kamtschatka" (Gloucester, 1764). In the diagnosis he says: "*gutture et orbitis albis, facie nuda et cæruleascente rubra,*" which, as compared with Pallas's diagnosis of *Ph. per-*

spicillatus (Zoogr. Ross. As., II, p. 305) "*facie nuda rubro cærulescentique varia, circulo cutaneo oculos ambiente albo,*" has caused the belief that *urile*, at least partially, was referable to *perspicillatus*.

If we now turn to the "Arctic Zoology," p. 584, we find the following:

"C. RED-FACED CORVORANT. Ouril of the Kamtschatkans, *Descr. de la Kamtschatka*, 498.—*Latham*, iii.

"*P.* With a slender bill; upper mandible black; lower red: from the bill to the eyes is a space covered with a bluish red, naked skin: round each eye a white cutaneous circle: * * * on the fore part of the neck a few white slender feathers; * * * tail consisting of twelve feathers only. * * * LENGTH of one I measured thirty-one inches. *Steller* compares its size to that of a goose.

"Inhabits the high precipices on the coasts of *Kamtschatka*."

We then proceed to the French edition of Kraschenninikoff's "Description du Kamtschatka" (Paris, 1763), the one cited by Pennant, from which we quote as follows (p. 493): "L'Ouril est de la grosseur d'une Oie ordinaire: * * * Il a aussi sur le cou, par places, de longues plumes blanches & minces comme des cheveux. Les yeux sont entourés d'une petite membrane rouge, comme dans les Coqs de bois. * * *"

From the above it seems unquestionable that Pennant's, "a white cutaneous circle," is only a slip of the pen for "a red cutaneous circle" (entourés d'une petite membrane rouge), a conjecture we shall find confirmed if looking still closer into the matter. It may be well, however, to remark here that it also is evident that Pennant had a specimen which he had measured, and from which he took the characters "bill slender," and "tail consisting of twelve feathers."

Next comes Latham's description. (Synops., III, pt. 2, p. 601. London, 1785—same year as the Arctic Zoology.)

"Red-faced Corvorant, *Arct. Zool.*, p. 584, c. Urile, *Hist. Kamtsch.*, p. 157. 17.

"This is somewhat less than the *Corvorant:* Length two feet ten inches [34 inches]. Bill three inches and a half long; the base of a reddish green, the end black: round the eye a bare skin of a reddish colour: * * * on the middle of the neck before a few slender white narrow feathers thinly interspersed among the others, many of them two inches and a half in length: * * * tail six inches in length, consisting of twelve feathers. * * *

"Inhabits *Kamtschatka*."

From his reference, the English edition of the "History of Kamtschatka," p. 157, we only quote: "The fowl urile, of which there are great plenty in *Kamtschatka*, * * * has a red membrane or skin round the eyes," this latter expression being evidently the translation of Steller's "periophtalmiis cinnabarinis," as given in a foot-note.

It is plain from the above that Latham also had a specimen before him, and I think there can be little doubt that it was the same as

scribed and measured by Pennant,* the description of which agrees in every particular with the bird afterward described by Pallas as *bicristatus*.

We have now concluded (1) that the "Ouril" and "Urile" of the "Description of Kamtschatka" is the *bicristatus*; (2) that Pennant's and Latham's "Red-faced Corvorant or Shag" was based upon the above partly, and partly upon a specimen belonging to that very species; (3) that the character given by Pennant as "a white cutaneous circle" was only a slip of the pen; (4) that the name *urile*, given by Gmelin, and also the erroneous diagnosis, are based on the above; in other words, that *urile* is the older name for *bicristatus*, and that *urile* is not a synonym of *perspicillatus*, not even in part. The latter conclusion is also apparent by a comparison of the characters given, except the white (!) eye-ring.

Urile is said to have the bill slender; in *perspicillatus* it is robust. *Urile* has 12 rectrices only, while *perspicillatus* is said to have 14. The former is given as having white slender feathers on the fore part of the neck only, while the characteristic feature of the latter is the long and straw-yellow feathers on the head and neck.

There remains now only to dispose of the name *violaceus* GMEL., which is absolutely of the same date as *urile*, occurring on the same page.

In this case, too, Gmelin bases his name and diagnoses upon the same two works as above; his diagnosis, "P. niger violaceo-nitens, capite cristato." "*Habitat circa* Camtschatcam, *vicinasque insulas*," being a literal translation of the whole text of Pennant relating to the species, viz: "P. With the body wholly black, glossed with violet color. Found about *Kamtschatka* and the isles." Latham does not add anything, except the remark, "the size not mentioned."

It will be seen that it is impossible to determine the bird from the above description, so we may safely do away with a name which has caused so much confusion, being fortunate enough in having a name of the same date and of indisputable pertinency.

Mr. Taczanowski, in a recent memoir (Bull. Soc. Zool. France, 1883, p. 341) says: "Les deux espèces voisines des mers de Kamtschatka, sont si distinctes entre elles et si bien caractérisées par Pallas, qu'il est étonnant qu'elles soient confondues par plusieurs ornithologistes modernes." Schlegel (Mus. P. B., l. c.) cannot be said to have confounded them, as he

* The difference in the length—31 and 34 inches—is hardly of any account, if we remember that the measurements are taken from a mounted specimen.

quotes neither *Ph. pelagicus* PALL. nor *Ph. bicristatus* PALL. among synonyms of his *Ph. violaceus*. Swinhoe, in 1874 (Ibis, p. 164), cle pointed out the difference between the two forms, and was followe all later writers on Japanese ornithology. Professor Baird, in 1869 Chicag. Acad., I, 1869, p. 321), correctly kept the two species separ retaining for the one Pallas's name *bicristatus*, while applying Gme name *violaceus* to *pelagicus* PALL., and herein he has been followed b later American authors without exception. The only modern ornith gist, of any consequence, who has confounded the two species is evide Mr. Taczanowski himself, quoting, as he has done, *pelagicus* PALL. synonym of *bicristatus* PALL. (see Bull. Soc. Zool. France, 1877, p. 41

Mr. Taczanowski then proceeds to give a comparative table of distinctive characters of the breeding males of the two species; l although generally correct, he falls into some errors in describing colors of the naked parts. In *urile* (=*bicristatus*) the naked skin of face is not "d'un rouge minium," but bright reddish orange, while "peau nue sur la naissance de la mandibule inférieure, au bord d mâchoire, et de la gorge," is not "noirâtre," but beautiful blue. difference in color of the naked parts is truthfully represented in colored drawings, pl. viii, figs. 1 and 2, made by me from the fi specimens less than an hour after they were killed. The drawings represent the difference in the coloration of the iris in the two specie

It is not only in the coloration of the naked parts of the faces t the two species differ. They are easily told apart by structural dif ences in almost all ages, and even the downy young and the eggs easily distinguishable.

But before proceeding to a detailed comparison, I want to call at tion to the measurements of the two forms, as given in the paper of Taczanowski (*op. c.*, p. 343). In the first place, the measurement the "longueur totale" and the "vol" are transposed; this typograph error is obvious and easily disposed of. Looking at Taczanowski's t we find, however, that the measurements given show *pelagicus* to b larger bird than *urile* (*bicristatus*). But so is not the actual fact *urile* decidedly is the larger one of the two. An inspection of the m urements given by me under the headings of the two species will pr that such is the case.* I may add that the dimensions accompany Pallas's description of *bicristatus* and *pelagicus* likewise show the for

* The weight of an adult *urile* (No. 92877) was 5 pounds, while an adult speci of *pelagicus* at the same time only weighed 2 pounds 5 ounces.

to be the larger species. The opposite result of Taczanowski's table can only be accounted for by supposing that the measurements of the two species have been transposed in the same manner as those of the total length and the stretch of the wings.

Nobody, however, who has ever seen the adults of both species when fresh, or nearly so, mistook them for being the same species. The difficulty has arisen from the young plumage, in which both species are very much like each other. In the adult of the present species the feathering of the forehead does not reach the base of the bill, thus rendering it very easily separable from *Ph. pelagicus;* but in the young *urile* (=*bicristatus*) the forehead is as fully feathered as in *pelagicus*. Nevertheless, it is the outline of the feathering at the base of the bill which will furnish us with the best character, as in the young *pelagicus* it forms a well-pronounced malar apex below the angle of the mouth, while in *urile* it runs down in nearly a straight line without forming so conspicuous an apex.

A difference in the wing formula, as supposed by Mr. Swinhoe, cannot be verified in a large series, there being hardly two individuals of exactly the same relation between the primaries.

But also the young in the nest are rather easily distinguished even before they have got any feathers. I give the following remarks as I wrote them, with the downy young of both species, just taken out of their nests, before me:

In *urile* the limit between the whitish color of the gular portion and the lead-colored skin of the remaining portion of the body is very distinctly defined,	while in *pelagicus* this limit is much more irregular and has a quite different outline.
The dusky down of *urile* is tipped with brownish gray,	the down in *pelagicus* being uniform black, so as to give the whole bird a much darker appearance.
On the outside of the thighs is a large spot dotted with white down,	while white down is altogether missing in *pelagicus*.
Of structural differences, is especially to be mentioned, in *urile* the greater breadth of the bill at base,	compared with the much narrower shape of the bill at base in *pelagicus*.

Even the eggs of the two species cannot be confounded. Not only are those of *urile* considerably larger than those of *pelagicus*, but the green color, when looked at through the shell, is totally different, being much more bluish in the former, against yellowish in the latter.

The difference between the adults will be best understood from colored drawings (pl. viii, figs. 1 and 2), and no further remarks thought necessary, except perhaps, that the irides in the adult totally different colored, being brownish in *urile*, while green in *pelagi*

The color of the plumage and its general characters are pretty m the same in both species, except that the purplish bronzy gloss on scapulars is stronger and more violet in *urile* than in *pelagicus*, and t the latter has a more purplish tinge on the upper neck.

Before leaving the subject I may perhaps mention a structural cl acter which I noted in the fresh birds, viz, that in *urile* the outc longest—toe is proportionally much longer than in *pelagicus*, its joint reaching considerably beyond the tip of the nail of the middle while in the latter species the end of the nail just reaches the joint

I had no opportunities of investigating the changes of plumage the moult of the present species. The extensive series in the Natio Museum enables me, however, to state that the changes exactly c respond to those of the following species as examined by me. A tailed account of these observations will be found under the head of that species.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Bill along gape.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92877	2261	Glinka, Copper Island.	July 14, 1883	♂ ad.	791	188	300	171	54	79
92878	2287	Saint Mathew, Copper Island.	July 25, 1883	jun.	778	176	296	171	53	77
92879	2262	Glinka, Copper Island.	July 14, 1883	pull.	348	.....	.....	.....	.....	43

No. 92877.—Iris light, of a "raw umber" color. Bill, a upper mandible brownish-black, with a st on culmen, flames on the sides, and at base horny, yellowish white, at base, blue; lower mand horny yellowish; tip blackish; base faint bluish. Forehead, lores, and eye-region, naked smooth, and bright orange, connected with the rugated wattles which are orange-red and enc the gular sac by a narrow orange-colored stripe behind the mouth; the soft parts next to the bil around and the gular sac of a bright blue, tinged with violet, and deepening in color from the forel down to the gular sac. Feet uniformly brownish black without any kind of spots or mott Interior of mouth blue. Not fat. Weight, 5 pounds.

No. 92878.—Iris as in the foregoing specimen. Bill dark horny brown, towards base as slat naked parts of the face light flesh-color, with a faint tinge of bluish on the lower mandible; the ring with an olive tinge. Feet uniformly brownish black; webs lighter, dark brownish, wit blotchings. Weight, 4.6 pounds.

No. 92879.—Skin of body whitish next to the lower mandible, violet blackish on the rest of the somewhat lighter on the feet, and still more so on the belly and the inside of the tibiæ.

The inhabitants of the islands distinguish the present species "*Bolschoj Uril*" in contradistinction to the "*Malinkij Uril*," whicl

Ph. pelagicus. Being not only the rarer of the two species, but also the most difficult to shoot, no specimen was obtained from Bering Island, where it is only known to breed with certainty on Arij Kamen which also was the last refuge of *Ph. perspicillatus*. On Copper Island it is more numerous, especially towards the southern end of the island, but is by no means common, compared with the number of *Ph. pelagicus* in the same locality.

Three eggs (U. S. Nat. Mus. No. 21765, L. Stejneger No. 2263) were taken from a nest at Peresjejek, Copper Island, on the 14th of July, 1883. All three were perfectly clear, measuring 61 by 40, 63.5 by 39, and 66 by 37^{mm}. Another egg from Bering Island (Mus. No. 21766; L. Stejneger No. 2328) measures 61 by 39^{mm}.

86. Phalacrocorax pelagicus PALL.

1826.—*Phalacrocorax pelagicus* PALL., Zoogr. Ross. As., II, p. 303.—SWINH., Ibis, 1874, p. 164.—*Id., ibid.*, 1877, p. 147.—BLAKIST. & PRYER, Ibis, 1878, p. 216.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 187.—*Iid., ibid.*, X, 1882, p. 102.—TACZAN., Bull. Soc. Zool. France, 1883, p. 341.—TURNER, Auk, 1885, p. 158.

1849.—*Carbo bicristatus* TEMM. & SCHL., Faun. Jap. Av., pl. 84 (*nec* PALL.).—SWINH., Ibis, 1861, p. 410.—*Phalacrocorax b.* SWINH., Ibis, 1861, p. 408.—*Id., ibid.*, 1863, p. 434.—*Id.*, P. Z. S., 1863, p. 325.—WHITELY, Ibis, 1867, p. 211.—BLAKIST. & PRYER, Ibis, 1878, p. 216.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 188.—*Graculus b.* SWINH., P. Z. S., 1871, p. 420.—TACZAN., J. f. Orn., 1876, p. 203.—*Id.*, Bull. Soc. Zool. France, 1877, p. 41.—*Id.*, Orn. Faun. Vost. Sibir., p. 66 (1877).

1867.—*Phalacrocorax æolus* SWINH., Ibis, 1867, p. 395.

1872.—*Graculus violaceus* FINSCH, Abh. Brem. Ver., III, 1872, p. 86 (*nec* GMEL.).—*Phalacrocorax r.* NELSON, Cruise Corwin, p. 103 (*part*) (1883).

1874.—*Graculus bairdii* DALL, Avif. Aleut. Isl. west Unal., p. 8 (*nec* COOPER).

It will be seen that in the above synonymy all American references are left out, except those relating to the occurrence of the species on the Aleutian Chain. A close inspection convinced me that my birds, and also those from the other Aleutian Islands, are distinct from the race occurring on the coasts of the mainland of Alaska, being in fact nearer to the southern race, the so-called *Ph. pelagicus resplendens*. This fact, however, has no bearing upon the name of the Kamtschatkan bird, which certainly is the bird to which Pallas originally gave the name *pelagicus*. It is the Alaskan form which required a new name, and it has, consequently, been named by Mr. Ridgway *Ph. pelagicus robustus*.

I made a few observations regarding the change of plumage in this species which may be of some interest, as this part of the natural history of the Pacific birds seems to have been unduly neglected.

It will be necessary first to remark that these birds raise two broods

during the summer. This is not to be understood as a positive statement that the same parents rear two sets of young every year—although I believe that most of them do—but simply that I have found the colonies of this species having eggs and downy young at two different times. The first season commences early in May, the young of this brood being fully fledged in the latter part of July. In the middle of this month, however, the colonies again contained all stages, from fresh eggs to newly-hatched young. During the first days of August I found downy young of almost the same age and still without feathers, while on the 21st of August, 1882, I visited a numerous colony at Poludjonnij, Bering Island, in which the oldest young were about half fledged. These would not be able to fly before the first week of September. Between the two periods, young in all stages of development will be found in the colonies, but proportionately few in number. It will thus be seen that it is safe to assume that the difference in age between the earliest and the latest born young in one year amounts to three months, at least.

We are now prepared to understand that we can find two birds undergoing the corresponding moult at times as much apart as the birthdays of the same two birds. If the first moult occurs, say, ten months after the bird broke the shell, the bird born in the middle of May will moult in the middle of March next year, while the one born in the middle of August will not moult before the middle of June next year. And this conclusion is borne out fully by the observed facts. As will be seen from the details relating to the birds collected by me, as given below, I shot birds in the latter part of February, both young and older, which were just in the first stage of moulting; while on the

colors of the naked parts of the face and by lacking the white feathers on the neck and thighs. In the following spring, or when about twenty-three months old, it begins to breed.

The white plumes on neck and thighs belonging to the breeding plumage are generally assumed during the early part of the winter; still, many of them were undeveloped in a female shot on the 26th of April, 1883. These white feathers do not exclusively belong to the adult plumage, as a young female, shot in February, has the thighs of the sooty plumage broadly streaked with white feathers, which are not dense enough, however, to form a continuous patch. Even in the young, only a few days old, the down on the thighs is distinctly white, in strong contrast to the brownish color of the down on the rest of the body. The ornamental white plumes disappear in the course of summer, when the breeding process is over, at which time also the gradual moult of the wing and tail-feathers commences.

During winter the color of the naked parts in the young changes from an ashy flesh-color to a dark grayish brown, while at that time the adults have the caruncles of a dull brownish orange, which color, towards the breeding season, changes into a deep vermilion, while the skin between the caruncles remains dark grayish brown. Mr. Taczanowski says* that the red caruncles disappear after the breeding season, and that the naked sides of the face are then covered more or less with feathers. This is, however, not the case, his mistake evidently being caused by having before him young birds in their second plumage, say between thirteen and twenty months old.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen.	Bill along gape.	Tarsus.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
92120	1169	Bering Island	June 8, 1882	♂ ad.	726	.....	270	132	49	75	53
92119	1168	....do	June 8, 1882	♀ ad.	706	.....	261	144	45	62	49
92881	1927	....do	Feb. 21, 1883	♀ ad.	714	140	260	142	48	69	53
92883	2005	....do	Apr. 26, 1883	♀ ad.	678	146	.....	.....	.....	.....	.....
92882	1926	.. do	Feb. 21, 1883	♀ jun.	672	133	243	135	44	67	50
92880	2385	Copper Island	July 14, 1883	pull.	377	.....	.....	.....	.....	42	30

* *Tom. cit.*, p. 342.

No. 89120.—Iris yellowish green. Bill horny blackish brown, lighter at base; caruncles along border of bill, on the lores, around the eyes, and on the chin-angle brownish vermilion. Feet jet black.

No. 89119.—Colors exactly like foregoing.

No. 92881.—Bill blackish brown; lower mandible and especially the tomia lighter; naked parts of face dark grayish brown with brownish orange warts. Feet black. Nail of outer toe fells 22^{mm} short of tip of tail, legs being stretched backwards. New feathers in their sheaths, but still concealed under the old ones, all over the back, nape, and head. None of the white plumules in the sheaths. Very fat.

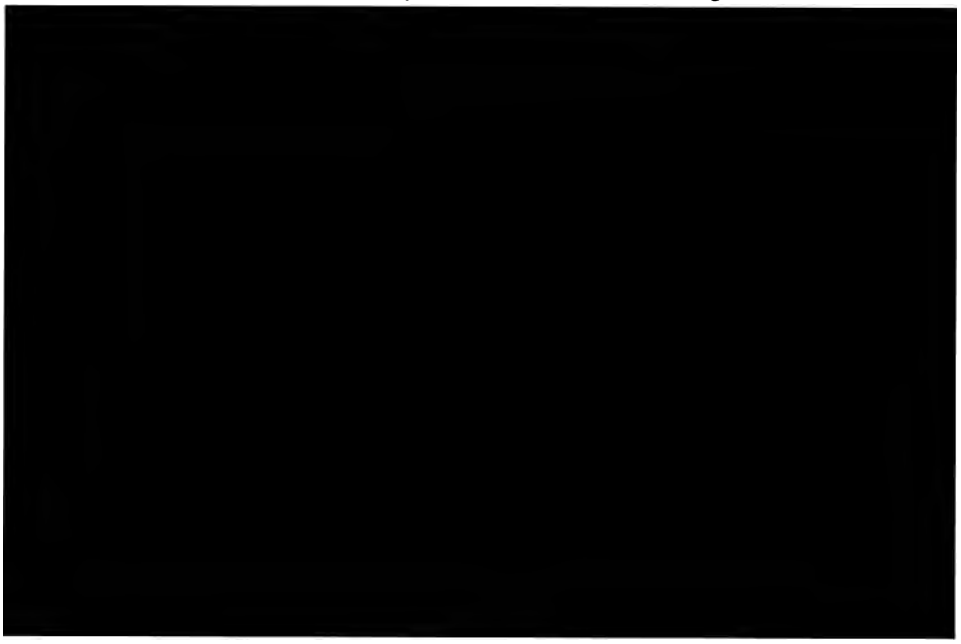
No. 2005.—Iris deep sea-green. Naked skin of face dark grayish brown with brownish vermilion papillæ. Feet black. Backwards stretched toes reach tip of tail; tip of closed wings hardly reach the heel-joint, nor do they reach the tips of upper tail coverts, the distance being 21^{mm}. All the white plumules are new, those on neck and head still partly or wholly in their sheaths. Largest eggs in ovary of the size of small peas. Extremely fat.

No. 92882.—Bill horny blackish brown, lighter along tomia; naked parts of face dark grayish brown. Feet black. New tertials and feathers on the crown of the head in their sheaths. The white plumules on the thighs show no traces of being new. Nail of outer toe fells 10^{mm} short of tip of tail, legs being stretched backwards.

No. 92880.—Colors of naked skin exactly as in the downy young of *Ph. urile*, No. 92879.

The Pelagic Cormorant is a very abundant resident of both islands, breeding on all the most rugged and steepest promontories which rise immediately from the sea, as well as on the outlying islets and stones. Many of them winter around the coast, but they are not by far so common at that season as during summer.

Although very plentiful at the present date, their number is said to have been vastly greater before 1876, when their endless myriads in some places were real "landmarks," which could be relied upon even in foggy weather, such a point, for instance, being the northern cape of Copper Island, as Captain Sandman informed me. But during the winter of 1876–'77 thousands and thousands were destroyed by an apparently epidemic disease, and masses of the dead birds covered the beach all round the islands. During the following summer comparatively few were seen, but of later years their number has again been increas-



The eggs measure as follows:

U. S. Nat. Mus. No.	L. Stejneger No.	Locality.	Date.	Diameters.
				Millimeters.
21763	1170	Bering Island	June 8, 1882	56 by 37.5
				56.5 by 37.5
				53 by 37
				59 by 37
21764	2264	Copper Island	July 14, 1883	59 by 34.75
				58 by 35

Of the latter set one egg was perfectly clear, the second contained a very small embryo, while the third one, which was broken, contained a somewhat larger fœtus.

ORDER RASORES.

Superfamily TETRAONOIDEÆ.

Family TETRAONIDÆ.

87. Urogallus parvirostris kamtschaticus (KITTL.).

1858.—*Tetrao kamtschaticus* KITTLITZ, Denkw. Reis., II, p. 354, fig. on p. 353.
1870.—*Tetrao parvirostris* GRAY, Handl. B., II, p. 276 (*nec* BP.).
1883.—*Tetrao camtschaticus* TACZANOWSKI, Bull. Soc. Zool. France, 1883, p. 333.*
1884.—*Tetrao urogalloides* BOGDANOW, Consp. Av. Imp. Ross., I, p. 24 (*part*).

The Kamtschatkan Capercalzie has been shown by Mr. Taczanowski to be distinct from the bird called by Middendorf *T. urogalloides*†, and I have only little to remark in addition to his very full and accurate descriptions (Bull. Soc. Zool. France, 1883, pp. 333–338). It is evident, however, that he lays too much stress on the difference in the graduation of the tail in the two forms, since my specimen is exactly intermediate, and hence I conclude that the two forms are not more than subspecifically distinct.‡

* Taczanowski quotes erroneously "Kittliz, Reis. Russ. Amer., I, p. 314;" the correct citation is as given above.

† It is strange that many authors still persist in using this name after it has been shown that Prof. Sven Nilsson, long before Middendorff, applied *urogalloides* to the hybrid between the Black Cock and the Capercalzie so common in Scandinavia. Whether applied to a hybrid or not, the name is preoccupied, and Bonaparte's substitute, *parvirostris*, should be adopted without delay. Its synonymy is as follows:

Urogallus parvirostris (BP.).

1826.—*Tetrao urogallus* PALL., Zoogr. Ross. As., II, p. 56 (*part*).
1853.—*Tetrao urogalloides* MIDD., Sibir. Reise, II, 2 (p. 195, tab. xviii) (*nec* NILS.).—SCHRENCK, Reise Amurl., I, p. 396 (1860).—RADDE, Reise Süd. Ost-Sibir. II (p. 290) (1863).—ELLIOT, Monogr. Tetr., pl. vi (1865).—DYB. & PARV., J. f. Orn., 1868, p. 336.—TACZAN., J. f. Orn., 1873, p. 98.—*Id.*, Bull. Soc. Zool. France, 1876, p. 242.—*Id.*, Orn. Fauna Vost. Sibir., p. 67 (1877).—BOGDAN., Consp. Av. Imp. Ross., I, p. 24 (1884).
1856.—*Tetrao parvirostris* BONAP., Compt. Rend., XLII, p. 880.

Pallas in a note (*op. cit.*, p. 58) mentions this species as a smaller variety, which the Russians call "Rock Capercalzie." Upon this has been founded the following altogether unwarranted quotations: "*Tetrao urogallus* var. *minor* Pallas Zoogr. R. A., II, pp. 58, 59" (Elliot, Monogr. Tetraon., text to pl. vi), and "*Tetrao urogallus* var. *rupestris* Pallas, Zoographia Rosso-Asiatica, II, p. 58, Nota 2" (Bogdanow, Consp. Av. Imp. Ross., I, p. 24).

‡ Of the genus *Urogallus* we then have two well-defined species. It does not seem that *Urogallus urogallus* has been studied closely enough as to its local varie-

The downy chicks of this form, which is rather common on the mainland of Kamtschatka, have not yet been described so far as I know. I was fortunate enough to obtain two, the larger of which may be described as follows:

Pullus (*U. S. Nat. Mus., No.* 92705; *L. Stejneger, No.* 2300. *Petropaulski, Kam., beginning of July*, 1883).

Above pale rusty ochraceous, more or less spotted with blackish; underneath pale buff, more yellowish on jugulum and abdomen, unspotted; the spots on the upper surface are arranged as follows: On the forehead an arrow-shaped blackish spot and a double one on the lores; just on the border between forehead and crown a large horseshoe shaped spot with the opening turned toward the beak; on the crown a somewhat indistinct cross-streak, and a similar one across the nape; on the ear-coverts two very distinct spots, and behind them, on the side of the neck, a larger rusty brown spot circumscribed by black; along the middle of the hind neck a longitudinal streak; back more or less mottled with dusky, which color on the posterior part of the back forms into two indistinct parallel longitudinal bands of a more rusty hue. The remiges and the larger coverts are out, with more or less regular mottlings of dusky and pale rusty in both webs and broadly margined with rusty cream-color, which also runs up along the shafts; the tips of the light margins of the great coverts are nearly white, so as to form a conspicuous band across the wing. Chin, throat, and tibiæ pale buff, as the rest of the under surface, and without dark markings.

The two specimens are exactly alike in every particular.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Expos. culmen.	From anterior border of nostrils to tip of bill.	Tarsus.	Middle toe with claw.	Graduation of tail.	Distance from upper tail-coverts to tip of tail.	Height of bill.
				1883.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
92704	2299	♂ jad	Petropaulski	March	375	315	37	24	68	73	100	96	21
92705	2300	pull.	....do	July	70	25	9	6	23	23	.....	.....	.....
92706	2301	pull.	....do	July	61	12	8	5	21	22	.....	.....	.....

Obs. There are apparently at least two forms in Europe (being now without sufficient material, I shall only hint at *Tetrao eremita*, described in "Svenska Vetenskaps Akademiens Handlingar för 1789" (p. 179), which is "smaller than the usual bird, and ashy gray, with somewhat darker head and neck"), and one East Siberian variety which may be called *Urogallus urogallus taczanowskii*. It is described by Mr. Taczanowski thus: "Les mâles obtenus d'Irkutsk se distinguent par plusieurs détails des oiseaux de l'Europe, c'est-à-dire: ils ont les pattes beaucoup plus velues, et les doigts couverts jusqu'à la dernière articulation; ils ont le bec un peu plus court, plus renflé sur les côtés au devant des narines; le plumage en général plus mou avec un dessin généralement plus fin. Les femelles ont les plumes des pattes plus abondantes que dans les femelles européennes, mais la différence n'est pas aussi grande que chez les mâles; leur bec est aussi plus large à la base" (Bull. Soc. Zool. France, 1876, p. 243). The other species is *Urogallus parvirostris* (Bp.) with its two subspecies *U. parvirostris kamtschaticus* (Kittl.), and *Urogallus parvirostris sachalinensis* (Bogdanow) (*Tetrao urogalloides* var. β. *sachalinensis* Bogdan., Consp. Av. Imp. Ross., I, 1884, p. 122).

88. Lagopus lagopus (LIN.).

1758.—*Tetrao lagopus* LIN., S. N., 10 ed., I, p. 159.—PALL., Zoogr. Ross. As., II, p. (*part*) (1826).

1788.—*Tetrao albus* GMEL., Syst. Nat., I, 2 p. 750.—*Lagopus a.* MIDD., Sibir. Reise, II (p. 190) (1883).—SCHRENCK, Reise Amurl. I, p. 395 (1860).—RADDE, Reis Süd. Ost-Sibir. (p. 294) (1863).—BAIRD, Trans. Chic. Acad., I, 1869 (663).—DALL & BANN., *ibid.*, p. 287.—FINSCH., Abh. Brem. Ver., III, 18 p. 62.—TACZAN., J. f. Orn., 1873, p. 98.—*Id.*, Bull. Soc. Zool. France, 18 p. 242.—*Id.*, Orn. Faun. Vost. Sibir., p. 47 (1877).—BEAN, Pr. U. S. N Mus., 1882, p. 163.—NELSON, Cruise Corwin, p. 80 (1883).—STEJNEGER, P turen, 1884, p. 8.—BOGDAN., Consp. Av. Ross., I, p. 32 (1884).

1788.—*Tetrao lapponicus* GMEL., Syst. Nat., I, 2, p. 751.

1815.—*Tetrao saliceti* TEMM., Gall. et Pig., III, p. 208.—KITTL., Denkw., II, p. 1 (1858).—ADAMS, Ibis, 1878, p. 436.

1817.—*Tetrao subalpinus* NILSS., Orn. Svec., I, p. 307.—*? Lagopus s.* NORDQUIST in N DENSKJ., Voy. Vega, Amer. ed., p. 433 (1882).

1883.—*Lagopus alpinus* NELSON, Cruise Corwin, p. 82 (*nec* NILSSON).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	
					mm.	mm.	mm.	
92707	2042	Petropaulski	May 19, 1883	♂ ad.	417	72	203	
92708	2048	do	May 19, 1883	♂ ad.	410	65	200	

No. 92707.—Iris dark brown. Bill horny blackish, plumbeous. Crop contained buds of willows, kins of alder, and a hip of *Rosa kamtschatica*.

A few small flocks were met with on a hunting expedition in the neig borhood of Petropaulski on the 19th of May, 1883. They were exce ingly shy, and as the snow was 4 to 6 feet deep on the ground we had hunt the grouse in sledges drawn by ten dogs, and to shoot from t sledge. A strange way of hunting grouse! Only the males had co menced assuming the dark plumage, the head and neck being alrea brown, all the brown feathers still partly in their sheaths.

This species does not occur on the islands.

89. Lagopus ridgwayi STEJNEGER.

1826.—*Tetrao lagopus* PALL., Zoogr. Ross. As., II, p. 63 (*part*).

1883.—*Lagopus albus* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 72 (*nec* GMEL. *cf.* "The Auk," 1884, p. 82).

1883.—*Lagopus alpinus* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 368.

1884.—*Lagopus ridgwayi* STEJNEGER, Proc. Biol. Soc. Washingt. I, April 10, 1884, p. 9 *Id.*, Amer. Naturalist, XVIII, 1884, p. 774.—*Id.*, Zeitschr. Ges. Orn., I, 1 p. 89 pl. v.—*Id.*, Ibis, 1885, p. 50.

1884.—*Lagopus rupestris* subsp. *insularis* BOGDANOW, Consp. Av. Ross, p. 34.

I consider myself excusable in making the mistake of calling this bird *Lagopus albus*, when I wrote my preliminary report on the islands, although it really belongs to the *Attagen* group, so differently colored is it from all other Rock-ptarmigans. Of course, if I had looked closer at the structural characters, such an error could not have happened, but the specimens were not at hand when I wrote my report, and the general color, in connection with the statement of Prof. W. H. Dall (Notes on the Avifauna of the Aleutian Islands, especially those west of Unalashka, 1874, p. 5) that *L. albus* is the only species of grouse found on the Aleutian Islands,* led me to make such a blunder. As soon as I got winter specimens the mistake was plain, but I never dreamed of a new species of ptarmigan before it came to actual comparison of specimens.

It seems from the blackish præstival plumage of this species, especially the almost uniform blackish præpectus, that it is more nearly allied to *L. muta* than to *L. rupestris*, in spite of its brown color; but it is a perfectly good species and affords a most interesting proof of the palæarctic relationship of the Commander Islands on the one hand, and of their remarkable isolated zoological position on the other. It would almost seem as if the isolation, as a factor in the development of new species or forms, is effective in inverse proportion to the size of the isolated area. The ptarmigans of Europe have been separated from each other on three or four different mountain systems, probably as far back as the end of the Glacial period. Still the difference between *L. mutus* from Scandinavia and *L. mutus vulgaris* from Southern Europe is rather slight. It is at present hardly possible to tell how long a time has elapsed since the Commander Islands have been separated from the mainland; but, even if that took place still earlier, the distinctness of many of the birds appears very remarkable.

Before entering on a more detailed comparison with allied forms, some remarks upon the changes of plumage among these birds may not be out of place.

In my preliminary report (p. 74), I concluded "that no marked seasonal plumage can be distinguished, except the white plumage of the winter and the dark one of the summer," for the reason that these birds

* It now turns out that the species inhabiting the American islands of the Aleutian Chain belong to two different races, *L. rupestris nelsoni* STEJN., and *L. rupestris atkhensis* (TURNER), and that *alba* does not occur at all on the islands. It is first on the Shumagin Islands that *alba* is found. I have myself examined a ♀ in breeding plumage obtained by Dr. T. Bean on Unga.

are "subject to an uninterrupted change from the moment when the first dark feathers make their appearance in spring until the last one has disappeared in fall." Additional material and subsequent observations force me to modify this statement to the effect that there are two very different summer plumages indeed—one præstival and one postæstival, which, however, on account of the uninterrupted change during the whole summer, are, during the middle part of the season, so blended and mixed together as to justify the expression that there is no marked limit between them. As to my failure in recognizing a third summer plumage I refer here to some remarks further below.

The first dark feathers of the summer plumage of the male make their appearance on the upper part of the head about the beginning of May. Still, in the middle of June, the greater part of the lower surface, except the jugulum and præpectus, are white, and many white feathers of the old plumage are mixed among the dark ones on the upper parts. These dark feathers are more or less uniform blackish; an explicit description of this plumage will be found further on, sub No. 89059. In some males the moulting proceeds more rapidly, in others the process takes longer time. A male shot on the 11th of June, 1883, had much more white than the one referred to above. From this time feathers, more regularly transversely banded, and vermiculated with brown, protrude between the first ones; similarly colored feathers take the place of the white ones below; the first blackish feathers are also shed, until the bird, a little later than the middle of August, has assumed its full summer plumage, in which even the abdomen and the tibiæ are blackish, there being no other white feathers than those of the wings. This perfect plumage lasts hardly fourteen days, as the white feathers of the new winter plumage, simultaneously with the last brown ones, now commence protruding from their sheaths. In the middle of October the bird has the white and brown similarly distributed as in the middle of June, and before the middle of November the perfect white plumage is completed.

The moulting of the wing-feathers takes place about the time when the summer plumage is most perfect, that is to say, about the middle of August. The new primaries have then blackish shafts, a color which in the following spring fades away, so that the old feathers when shed have almost wholly white shafts.

The late Prof. Sven Nilsson was the first who discovered that the ptarmigans yearly shed their claws as regularly and completely as they

moult their feathers, an observation fully sustained by my specimens. In the birds shot in July and August, before shedding, the middle claw measures 18 to 20^{mm}, while in a specimen shot on the 23d of August, and which has just thrown the old ones away, the length of the new claw is only 11^{mm}. Most interesting is, however, a male, shot the same day, as it has the claws only half shed, the old claws having loosened from their base and forced 2 to 3^{mm} out, still covering the tip of the new ones, except on two of the toes, in which they have already fallen off (No. 89062).

The old tail-feathers, the white ends of which are wholly worn away, are shed a little later, and replaced by new black ones, with broad white terminal edges in October specimens.

A similar change takes place in the plumage of the females, as the first broad-barred plumage is succeeded by a finely mottled garb, which they assumed later than the males, and which does not seem to reach its full development, as the white feathers protrude before it is finished. In spring the moult of the females commences earlier and takes place more rapidly than in the males.

Since the preliminary report was written I shot another male, on the 19th of October, which at a close examination fully convinces me that there is no distinct third summer plumage, in this species at least. Strange enough, I at first regarded this specimen as a proof against this opinion, so that at one time I really believed in a third summer plumage, as maintained by Professor Newton, because the aspect of the bird, on a superficial look, certainly seems different, especially lighter. But if placed alongside those shot in August it will be seen that the brown feathers on the back are exactly like those of the birds in the perfect dark plumage, and that the light appearance is caused by the new white feathers which are protruding from below the brown ones and shining through them.

I believe that this is the explanation of the third summer plumage in the allied forms also, and the material at hand seems to indicate the same. I am led to this belief by the fact that *L. ridgwayi* is the species which seems to have the most highly developed dark plumage of all forms known to me; further, that it, more than others, shows a tendency to retain a dark color even in winter, consequently warranting the presumption that it ought to have the third fall plumage, if such a thing occurred at all among the allied species.

This tendency to assume a dark color in winter needs further ex-

planation. Among the ptarmigans shot on Bering Island during the winter 1882–'83 a considerable proportion are found having a number of dark feathers among the white ones. Some of these feathers were wholly dark colored, other ones only partially so, with larger or smaller dark spots on the white feathers, sometimes symmetrically, sometimes only on one web, sometimes obliquely over both. Not less than about 6 per cent. among some seven hundred specimens examined were thus marked, males and females, a proportion which held good throughout the winter, at the beginning, in the middle, and at the close.

Such dark feathers among the white ones also occur in the allied species, though not to such an extent, that I am aware of, and has probably given rise to the theory that the dark feathers of the fall plumage fade into the white winter garb without moulting. But if any proofs are needed against this hypothesis my specimens will furnish them. In the first place, I found partially dark feathers in their sheaths, and in the second place, *these dark feathers of the winter plumage are totally different from those of the fall plumage of which they ought to be the remnants!* The postæstival plumage of the males is of a saturated ferruginous brown, with fine, but distinct, blackish vermiculations and cross-bands. The dark feathers of the male's winter plumage are almost wholly black, sometimes with some faint and indistinct brownish undulations and shadings, consequently more like the feathers of the preæstival or spring plumage. The ground color of the summer plumage of the females is of an ochraceous orange color, with rather broad blackish cross-bars; the dark feathers among the white ones in winter are brown, very finely undulated and vermiculated, and consequently very much like those of the fall plumage *of the male*!

One of these females (No. 92717) had a very well pronounced black loral stripe too, as had in fact not a few of them, but upon dissection I found the ovary normal; no trace of sterility, nor indication of any disease.*

The most interesting specimen in regard to this dark winter plumage is a female (No. 92714), the sex of which was also determined by dissection, and which had the ovary well developed and normal. Besides having a mere indication of a black eye-stripe and several brown feathers on the hind neck, the seventh, eighth, ninth, and tenth primaries and the eighth primary covert on each wing are not white, as is otherwise

* This case shows how hyper-cautious the collector must be in indicating the sex. He should make it a rule *never* to mark the sex upon a label if he has not examined *the specimen* by dissection.

the case in all plumages, both summer and winter, but show the following coloration:

The ground color is a delicate creamy yellow, becoming whitish toward the tip of the interior feathers. The outer web has a series of dusky spots, while the inner one is marbled rather coarsely with blackish, darker toward the base, where the feathers appears dusky with faint light mottlings, while the tip is without dark markings.

Proceeding now to the comparison of *L. ridgwayi* with allied forms it will be well to bear in mind that there are at least four different stages which must be compared with corresponding stages of the other kinds. It would not do to compare a præstival *L. ridgwayi* with a postæstival *muta*, or a female of the former with a male of *rupestris*. It is, however, on similar comparisons that the present most generally adopted views concerning this interesting group of birds are based. It may furthermore be remarked that we are not satisfied with the negative results furnished by the fact that we hardly can distinguish ptarmigans in their white winter plumage.* Nor do we consider all the rock-ptarmigans identical, even if the distinguishing marks pointed out by the late Professor Sundevall do not hold good. He paid especial attention to the greater or lesser extent of the white markings on the exterior tail-feathers, but later authors have denied the value of this character and proved a great individual variation in this respect. Nevertheless, it seems to me that the characters will average as indicated by him. An observation by me, and verified on a large series of specimens, seems to prove, that the females have more white at the base of the exterior rectrices than the males.

It has already been mentioned that *L. ridgwayi* is sufficiently distinguishable from *L. rupestris* by the uniform black præpectus of its præstival plumage, agreeing in this respect with *muta* and its allies. From these it is distinguished in its summer plumage not only by the saturated brown color, but especially by lacking every trace of whitish or grayish edgings of the feathers, there being in the postæstival plumage only some faint indications of lighter rusty at the end of a few feathers. I have seen Norwegian specimens of *L. muta* almost without whitish edgings, but it was in every case plainly due to abrasion, while in the

* This assertion does not seem quite superfluous in view of the following comparison of Dr. O. FINCH: "One specimen [of *alba*] in the uniform white winter plumage from Alexandrovsk is not in the least distinguishable from European specimens (from Russia and Norway) in the museum in Bremen. The distribution of the species [*alba*] *consequently* embraces the whole Arctic region, as is also the case with *L. alpinus* NILSS.

new species they are wanting, as well in the first and not fully grow feathers, as in those of the more advanced season; besides, the tw birds could never be confounded on account of the different groun color, this being decidedly grayish in *L. muta*.

There is one point, however, in which *L. ridgwayi* seems to differ fro all the known forms of both *muta* and *rupestris*, and that is, that the perfect summer plumage of the male the feathers of the abd men and the tibiæ are of a dull, smoky black, a coloration I have n been able to find in any of the numerous specimens of the other speci examined by me; nor have I been able to find it mentioned in any d scription, all of which expressly state that the abdomen is always whit

As might be expected, the female of *L. ridgwayi* differs only ve little in color from the females of its congeners. In the presestiv plumage the light bars are, perhaps, a little more distant, and t yellow color a shade richer and more brownish orange than in *rupestr*

A small chick taken on Bering Island, August 5, 1882, shows a gre difference from one of corresponding age from Quickjock, in Norwegia Finmarken (U. S. Nat. Mus. No. 33550, July 25, 1862), as it is rich brow ish orange with much broader barring and fewer white spots than t rather dull-colored specimen from Norway. A very striking differen also prevails in the coloring of the wing-feathers, which in the pullus *ridgwayi* are distinctly and broadly barred with orange and blackis especially the inner ones, while these feathers in *muta* are grayish brow with minute yellowish gray vermiculations and scarcely any indicati of cross-bars. On the other hand, the Norwegian specimen is distinct barred over the whole breast, while in the Bering Islander the mo distant dark cross-bars are confined to the sides of the breast only.

The general size does not differ from its nearest allies, but the bill considerably longer and stouter, in the latter respect intermediate t tween *L. alba* and the members of the *Attagen* group, and, as to the bi probably approaching *L. islandorum* (FABER).

All taken into consideration, I regard *L. ridgwayi* as a well-defin species; in fact, as the best circumscribed form in the whole group, *hyperborea* (SUND.) not excepted.

♂ *ad.*—*U. S. Nat. Mus. No.* 89059, *L. Stejneger No.* 1167. *Bering Island, June* 6, 18

Most of the nasal, mental, and malar feathers, breast, flanks, abdomen, under ta coverts, primaries, secondaries, and most of the wing-coverts, a few feathers on t lower back, and uropygium, and also the two longest upper tail-coverts, still white, t shafts of the remiges being almost wholly white. The remainder of the plumage of a dull blackish brown, with ferrugineous brown transverse bars round the nec the feathers of the lower back and uropygium finely mottled with the same color;

similar mottling is partly seen on many other feathers especially on those of the shoulders.

First primary shorter than sixth; second shorter than fourth, longer than fifth; third equal to fourth, longest. (See list of specimens collected.)

♀ ad.—*U. S. Nat. Mus. No.* 89062, *L. Stejneger No.* 1487. *Bering Island, August* 23, 1882.

Primaries, secondaries, most of the wing-coverts, and the remnants of the feathers covering the tarsus, white, more or less soiled and abraded, except the new feathers in the wings. Forehead and crown black, with ferruginous brown edging; chin smoky black, with whitish edging. Middle of breast and abdomen, including the peculiar loose and downy feathering of the latter, and the tibiæ, smoky black, the latter whitish at the base and somewhat grayish at the tips, giving these parts a cloudy appearance. The remaining plumage, including the under tail-coverts, distinctly crosswise vermiculated with black and saturated ferruginous brown, except on the longest upper tail-coverts, and the sides of the abdomen where the design is so indistinct as to become a fine mottling only; in some of the feathers of the back the terminal or subterminal brown is of a somewhat lighter shade. Tail-feathers black to the base, and the white tips wholly worn away. The inner primaries are new and not yet fully out. They have blackish shafts, while those on the three first primaries, still left from the foregoing winter plumage, are almost wholly white.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing beyond tail-feathers.	Wing.	Tail-feathers.	Bill from nostrils.	Remarks.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	
89059	1167	Bering Island	June 6, 1882	♂ ad.	390	.....	187	102	10.0	Type!
92713	1342	....do	July 29, 1882	♂ ad.	382	.....	193	107	11.2	
89058	1419	....do	Aug. 10, 1882	♂ ad.	387	.....	197	112	10.5	
89062	1487	....do	Aug. 23, 1882	♂ ad.	385	.....	191	108	12.0	Type!
89060	1489	....do	Aug. 23, 1882	♂ ad.	396*	.....	190	111	10.5	
92716	1689	....do	Oct. 19, 1882	♂ ad.	396	.....	197	111	11.2	Type!
92901	2083	....do	May 25, 1883	(♂) ad.	.....	.....	197	103	11.0	
92902	2164	....do	June 11, 1883	♂ ad.	391	59	200	112	11.3	
92709	1867	....do	June 11, 1883	♂ ad.	411	73	201	106	10.7	Type!
89061	1165	....do	June 6, 1882	♀ ad.	357	.....	182	100	10.0	
89057	1418	....do	Aug. 10, 1882	♀ ad.	376	....	187	94	10.5	Type!
92710	1677	....do	Oct. 9, 1882	♀ ad.	.....	.....	186	94	10.5	
92714	1869	....do	Jan. 9, 1883	♀ ad.	384	60	185	98	9.5	
92717	1868	....do	Jan. 11, 1883	♀ ad.	375	63	179	91	9.5	
92712	1877	....do	Jan. 19, 1883	♀ ad.	381	75	187	93	9.3	Type!
92715	1891	....do	Jan. 29, 1883	♀ ad.	358	78	182	91	9.7	
92711	1940	....do	Mar. 3, 1883	♀ ad.	384	.....	189	89	9.5	
89063	1399	....do	Aug. 5, 1882	pull.	170	.....	93	33	5.7	

No. 92713.—Iris dark brown. Contents of gullet: seeds of *Polygonum*.

No. 89058.—Naked portion of toes light pearl gray.

No. 92716.—In the gullet only buds of a *Salix*.

No. 92709.—Bill horny black. Gullet crammed full with ends of *Empetrum nigrum*, and a few leaves of *Rhododendron chrysanthum*.

No. 92717.—Gullet crammed with ends of *Empetrum* and buds of a *Salix*.

No. 92712.—In gullet leaves of *Empetrum* and a few ones of *Rhododendron*.

No. 92715.—Contents of gullet same as of foregoing specimen.

No. 89063.—Iris dark brown.

The "*Kuropatka*" or "*Kuropaschka*," as the natives call the ptarmigan, is very common on both islands, although much more numerous on Bering than on Copper Island. During the winter of 1882–'83 two hunters shot not less than fourteen hundred of them,* and our bill of fare during the whole time from November to March was every day distinguished by ptarmigan in some or another style, and not seldom was its palatable meat served twice a day. The natives, however, do not appreciate it as it deserves, as it is too dry for them, and, if taken ill, they will, by far, prefer a tender old "Tschaika" (sea-gull). It is well so, as otherwise not many ptarmigans would be left. It happened several times that, after an absence of an hour and a half, I returned home with between thirty and forty birds on the sledge. In March the flocks are loose, and, leaving the low-lands, they are then mostly found on the mountains about 600 to 1,000 feet above sea level. Toward the end of April the flocks disband completely, and the cry of the males is heard everywhere among the mountains, while the hen keeps herself better concealed. On a short trip in dog sledge to the south end of the island during the latter part of April I shot as many ptarmigans as I cared for, but they were all single birds and males, without exception.

The habits of the present species do not show any difference from those of the allied ones. It feeds chiefly upon the leaves of *Empetrum nigrum*, partially also on those of *Rhododendron chrysanthum*, more seldom on *Betula nana* and *Salix*, and, in the autumn, on berries and the seeds of *Polygonum*, the latter being a favorite food of the chicks.

On the 6th of July, 1883, I found a nest on Copper Island, close to the seal-rookery at Karabelnij. It was a rough affair consisting of dry grass and a few feathers, with a diameter of 140^{mm}. It contained nine quite fresh eggs (No. 2321, U. S. Nat. Mus. No. 21804), resembling those of the allied species. The long and short diameters measure as follows: 46 by 33^{mm}, 48 by 32.25^{mm}, 46 by 33^{mm}, 45 by 32.5^{mm}, 45 by 32^{mm}, 45 by 32^{mm}, 45.5 by 32^{mm}, 45 by 32.25^{mm}, 45 by 31.5^{m}.

Two eggs of another set, collected in July, 1882, on Bering Island (No. 1393, U. S. Nat. Mus. No. 21805) measure 46.5 by 32.25^{mm}, 47 by 32^{mm}.

* STELLER gives the following account of the occurrence and tameness of this bir (PALL., Zoogr. *l. c.*): In insula Beringii gregariæ, hominem minime formidant fustibus occidi et in uno loco intra horæ spatium ad 80 sclopo occidi potuerint, m naufragorum solatio. The natives even now occasionally kill them with sticks.

Order ACCIPITRES.

Superfamily ACCIPITROIDEÆ.

Family FALCONIDÆ.

90. Falco rusticolus Lin.

1758.—*Falco rusticolus* Lin., Syst. Nat., 10 ed., I, p. 88.—*Id.*, Syst. Nat., 12 ed., I, p. 125 (1766).—Fabricius, Fauna Grœnl., p. 55 (1780).—Mohr, Islandsk Naturh., p. 19 (*part*) (1786).—Gmelin, Syst. Nat., I, p. 268 (1788).—Latham, Ind. Orn., I, p. 28 (1790).—Stejneger, Auk, 1885, p. 188.

1764.—*Falco islandus* Brünnich, Orn. Bor., p. 2, No. 9.—Gmelin, Syst. Nat., I, p. 271.

1776.—*Falco islandus fuscus* Müller, Prodr. Zool. Dan. (p. 73 et p. viii, fide Fabr.).

1780.—*Falco fuscus* Fabricius, Fauna Groenl., p. 56.

1783.—*Falco gyrfalco* Boddaert, Tabl. Pl. Enl. (pl. 210). p. 13 (nec Lin.).—Taczanowski, Bull. Soc. Zool. France, 1883, p. 331.

1788.—*Falco candicans β islandicans* Gmelin, Syst. Nat., I, p. 275.—Schlegel, Rev. Crit., p. i (1844).—*Id.*, Abh. Zool. Anat., I, p. 14 (1884).

1800.—*Falco islandicus* Daudin, Tr. d'Orn., II, p. 100.—Brehm, Lehrb. Vög. Eur., p. 44 (1823).

1800.—*Falco groenlandicus* Daudin, Tr. d'Orn., II, p. 107.—Brehm, Isis, 1826, p. 990.

1854.—*Falco arcticus* Holböll, Zeitschr., Ges. Nat., III (p. 426) (nec *F. communis μ arcticus* Gmel., 1788).

1869.—*Falco gyrfalco groenlandicus* Schlegel, Mus. P. B. Falcones, p. 13.

1869.—*Falco gyrfalco islandicus* Schlegel, Mus. P. B. Falcones, p. 14.

1873.—*Falco holbœlli* Sharpe, P. Z. S., 1873, p. 415.

1882.—*Hierofalco gyrfalco sacer* Bean, Pr. U. S. Nat. Mus., 1882, p. 161 (*nec* Forst.).

1883.—{*Falco gyrfalco-candicans* / *Falco candicans-gyrfalco*} Seebohm, Brit. B. Eggs, I, p. 16.

1884.—*Hierofalco islandus* a. *holbœlli* Gurney, List Diurn. B. Prey, p. 111.

The Gray Gyrfalcon, as Mr. Gurney appropriately calls this form of the circumpolar species, usually referred to as *Falco gyrfalco*, was the only form obtained on Bering Island during the winter. It was at that season by no means uncommon, and fed chiefly on the numerous field-mice which now infest that island; but, being very shy, specimens were only secured with great difficulty. Whether this species also breeds on the island, I am unable to say, but the female, shot as late as May 5, had the ovaria in such a condition as to make it probable that she was going to breed there. This specimen was just changing from the young to the adult plumage.

The adult female (No. 101193), a very fine specimen in perfect plumage, was collected by Mr. Grebnitski after my departure and kindly presented to me.

I have been unable to distinguish, at present, the alleged races this particular form, the Greenland *holbœlli* and the typical Iceland bird. My specimens from Bering Island are rather light, howeve and may, perhaps, be nearest related to the Greenland race, if a average differences exist. I should, however, be inclined to the beli that in such case the Pacific bird might be entitled to separate recogn tion. The paucity and smallness of the dark spots on the under par would seem to indicate such a possibility, but, as remarked above, shall not venture to separate the possible races of the Gray Gyrfalco at present.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Chord of culmen from cere.	Tarsus.	Middle toe without
					mm.	mm.	mm.	mm.	mm.	mm.	mm
92719	1795	Bering Island	Dec. 13, 1882	♂	524	62	370	202	23	64	
92718	1930	....do.....	Feb. 28, 1883	♂	515	52	374	210	22	65	
92720	1959	...do.....	Mar. 23, 1883	♂	518	.....	360	205	22	66	
92721	2011	....do.....	May 5, 1883	♀	573	76	395	228	25	64	
101193	*64	....do	Jan. —, 1884	(♀) ad.	.....	.....	413	234	25	66	

* Grebnitski.

No. 92719.—Bill and cere bluish white; tip, including tooth, horny black; naked eye-ring whi faintly tinged with bluish. Feet white with a faint tinge of blue and yellow; nails uniform, hor black. Contents of crop: two *Arvicolæ*.

No. 92718.—Bill very light bluish gray; tip, including tooth, blackish; naked eye-ring blu white with a strong yellowish wash behind the eye. Feet dirty white with a slight tinge of blue a yellow (not green, however!). In the stomach a ball of hairs of *Arvicolæ*. Rather fat. Weigh pounds. New feathers in sheaths protruding all over the body, especially on the back.

No. 92720.—Iris dark brown. Bill light grayish blue, tip and tooth blackish; cere and naked e ring light bluish gray with a yellowish tinge. Feet dirty bluish white with a yellowish wash. Toe not swollen. Crop and stomach filled with remains of several *Arvicolæ*. Not fat. Weight, 4 pound New feathers in sheaths here and there all over the body.

No. 92721.—Bill light bluish gray, terminal half of both mandibles dark horny blue; naked eye-r light bluish gray; cere gray with an olive shade. Feet bluish white, yellowish underneath. C swollen, the diameter of the largest being 5.5mm. Crop and stomach empty. Extremely fat. Weig 4¼ pounds. New feathers protruding.

91. Falco islandus BRÜNN.

1764.—*Falco islandus* BRÜNNICH, Orn. Bor., p. 2, Nos. 7 and 8.—FABRICIUS, Fau Grœnl., p. 58 (1780).—LATHAM, Suppl. Synops., I, p. 282 (1787).—STEJN GER, Auk, 1885, p. 187.

1783.—*Falco gyrfalco* BODDAERT, Tabl. Pl. Enl. (pl. 446), p. 26 (*nec* LINN.).—*Accipi gyrfalco* SCHÄFFER, Mus. Orn., p. 7, pl. i (1789).—BREHM, Lehrb. Vög. Eu p. 43 (1823).—PALLAS, Zoogr. Ross. As., I, p. 324 (1826).

1786.—*Falco rusticolus* MOHR, Islandsk Naturh., p. 19 (*part*).

1788.—*Falco islandus β albus* GMELIN, Syst. Nat., I, p. 271.

1788.—*Falco islandus γ maculatus* GMELIN, Syst. Nat., I, p. 271.

1788.—*Falco candicans* GMELIN, Syst. Nat., I, p. 275.—DALL & BANNIST., Tr. Chi *Ac., I, 1869*, p. 271.—BLAK. & PR., Ibis, 1878, p. 249.—PALMÉN, Swed. Ca

London Fish. Exhib., p. 304 (1883).—SAUNDERS, Ibis, 1883, p. 350.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 351.—*Hierofalco c.* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.

1780.—*Falco islandicus* LATHAM, Ind. Orn., I, p. 32.—AUDUBON, Birds Am. (pl. cccLxvi) (1831).

1788.—*Falco grœnlandicus* TURTON, Gen. Syst. Nat., I (p. 147) (*nec* DAUDIN, 1800).—HANCOCK, Ann. N. H., II, p. 249.

1854.—*Falco islandicus candicans* HOLBÖLL, Zeitschr. Ges. Naturw., III (p. 426).

1866.—*Falco gyrfalco* var. *candicans* SCHRENCK, Reis. Amurl., I, p. 228.—*Hierofalco g. c.* NELSON, Cruise Corwin, pp. 77 and 56 *c* (1883.)

1874.—*Hierofalco holbœlli* SHARPE, Cat. B. Brit. Mus., I, pl. xiii, right-hand figure.

The White Gyrfalcon breeds on Bering Island, though in limited numbers only. A pair had their nest in a steep and inaccessible rock in the so-called "Nakovalnaja," a couple of miles from the main village. One of the old birds (No. 89126) was shot on the 27th of August. It is pure white underneath, spotted above, with black streaks on the crown and blackish, cordate spots on back and wings; the tail is uniform white, with dusky mottlings along the edges. This bird is the whitest of a large series in the National Museum.

The other specimen (No. 92722), a female, shot May 2, 1883, is pure and unspotted white below; the dark spots on the upper surface are brownish and very much faded and rather few; the form of these spots shows that the bird is in the "tear-dropped" stage; the streaks on top of head are very narrow; tail uniform white, with only faint brownish mottling along the edge.

The breeding of the White Gyrfalcon under latitude 55° is very interesting, and affords additional proof of the distinctness of this species as compared with *F. gyrfalco* and its allies. As to the name here applied, *Falco islandus*, I refer to my article in "The Auk," 1885, p. 185.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen from cere.	Tarsus.	Middle toe without claw.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
89126	1627	Bering Island	Aug. 27, 1882	(♂) ad.			400	235	27	70	51
92722	2006	do	May 2, 1883	♀	598	84	413	233	24	66	

No. 89126.—Bill bluish white, with a faint yellowish tinge, dark bluish gray at tip; cere dark bluish gray. Feet white, with a faint bluish tinge above, and a more yellowish cast below; nails dark bluish gray, whitish along the edges.

No. 92722.—Bill very light bluish gray, tip and tooth darker; cere and naked eye-ring with a faint yellowish wash. Feet white, with a faint bluish and yellowish tinge, both colors independently discernible; claws light horny brownish gray, at tip and below whitish. Extremely fat. In the crop was found meat, fat, and feathers of a gull.

92. Falco pealei RIDGW.

1854.—*Falco polyagrus* CASS., Illustr., pl. 16 (dark figure!).

1873.—*Falco communis* var. *pealei* RIDGW., Bull. Essex Inst., V, 1873, p. 201.

1874.—*Falco gyrfalco* RIDGW., Am. Nat. VIII, 1874, p. 434 (*nec* LIN.).—DALL., Aves Aleut. Isl. west Unal., p. 3 (1874).

1881.—*Falco peregrinus pealei* RIDGW., Nomencl. N. A. Birds, p. 37.—*Id.*, Ibis, 1882, p. 297 (foot-note).—NELSON, Cruise Corwin, p. 78 (1883).—TURNER, Auk, 1884, p. 157.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Chord of culmen from cere.	Tarsus.	Middle toe without claw.	Stretch of wing.
					mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
92726	1876	Bering Island	Jan. 19, 1883	♂ ad.	442	7	342	161	22	50	48	1045
92724	1800	....do	Dec. 9, 1882	(♀) ad.	.....	.....	385	194	26	59	51	.....
92725	2080	....do	May 18, 1883	(♀) ad.	(502)	.....	382	196	25	57	56	.....
92723	1862	....do	Jan. 9, 1883	♀ jun.	482	40	380	195	25	56	55	1158
Dybowski....		... do	Apr. 5, 1882	(♂) jun.	.....	.....	330	170	.....	49	48	.....
Grebnitski ..		....do	.....	(♀) jun.	(498)	(50)	378	200	.....	56	52	(1145)

No. 92726.—Iris dark brown. Bill with the terminal half bluish gray, darkening toward the tip and tooth, behind fading into the light yellowish gray color of the basal half; cere bright yellow; naked eye-ring pale yellow. Feet vivid golden yellow; claws blackish gray. Stomach contained feathers of a sea bird. Extremely lean, probably resulting from an old shot wound. Weight, 2½ pounds. New feathers in the sheaths protruding all over the body.

No. 92724.—Bill bluish white. Culmen, tip, and tooth horny bluish black; cere and naked eye-ring yellow. Feet yellow; claws black.

No. 92723.—Iris dark brown. Bill, cere, and naked eye-ring very light bluish gray with a faint yellowish tinge; terminal half of culmen and of upper tomia, including the tooth, as also the tip of lower mandible, horny blackish blue. Feet pale straw yellow with a faint greenish tinge; claws horny black. Stomach containing a few feathers only; in the crop a piece of meat. Very fat. Weight, 3

as I am aware, so that the following description may not be out of place:

ad. U. S. Nat. Mus. No. 92726; *L. Stejneger No.* 1876. (*Bering Island, Kamtschatka, January* 19, 1883.)

General color of upper surface clear plumbeous, darker, nearly blackish slate on the interscapuleum, the transition to the lighter color of the lower back and the uropygium formed by the light margins and cross-bands on the posterior interscapulars; the crown and nape are considerably darker than the lower back, but still distinctly plumbeous, and not blackish, with well defined, narrow, black, shaft-streaks; lower back rather indistinctly barred with dark plumbeous, the bars becoming deeper and more distinct on the uropygium and upper tail-coverts, and only half as broad as the light interspaces. Upper surface of the wings, primaries excepted, anteriorly blackish slate, gradually turning into plumbeous posteriorly, harmonizing with the adjacent parts of the back; the lesser wing-coverts, consequently, are nearly uniform blackish slate with slightly paler margins; those following have narrow, light cross-bars in addition, while on the larger coverts and the secondaries the light and the dark bars are of about equal breadth; primaries and primary coverts black, externally with a plumbeous tinge, the latter ones, as also the inner ones, of the former, narrowly tipped with whitish; the inner webs of the primaries with withish (more or less mottled with dusky), lense-shaped cross-spots, except on the terminal one-fourth. Tail light plumbeous, darkening somewhat toward the tip and covered by distinct blackish bars, generally narrower than the light interspaces; tips dirty whitish. Lower surface white, from the breast backward lightly tinged with plumbeous and with a general, but faint, wash of buff all over; chin and throat nearly immaculate, only a few black, hair-fine shaft-streaks on the latter; on the jugulum these streaks become gradually heavier and more numerous, and most of them widening at the lower end into small "tear-drops;" breast, sides, and flanks transversely barred with blackish, the bars on the breast, however, not being continuous, as they consist of series of transverse spots of a somewhat cordate form, near the tip of the feathers, but not reaching the edges; the width of these bars averages 3 to 4^{mm}, and the white interspaces 4 to 5^{mm}; further back, on belly, thighs, crissums, and under tail-coverts the dark cross-lines gradually become more plumbeous, more distinct, and narrower, the black lines averaging about 2^{mm}, the light interspaces 4 to 5^{mm}. Under wing-coverts and axillaries barred with very sharply defined black and white bands of nearly equal width, except on the axillaries, where the white predominates. Mustache, subloral region, the feathers bordering the naked eye-space, and a postocular streak slaty black; subocular and auricular region exactly like the top of the head, the dark shaft-stripes being a trifle less distinct perhaps, connecting with the white of the throat behind the mustache. For colors of bill, feet, and iris, as well as dimensions, see under "List of specimens obtained." Second primary longest, first one scarcely longer than third; only the first with inner web emarginated.

The young female, No. 92723, agrees in every particular with the type (U. S. Nat. Mus., No. 12022), the brown color being only somewhat darker, which is probably due to the fact that the type is mounted and has been on exhibition for many years.

Two young specimens had been collected on Bering Island during the winter previous to my arrival there, one, the male, belonging to Dr. Dybowski, the other, the female, to Mr. Grebnitski. With the kind permission of these gentlemen I made an accurate description of the two birds, which is here appended, the dimensions being incorporated with the "List of specimens obtained."

♂ *jun.* (*Bering Island, April* 5, 1882).

Upper surface blackish brown, faintly tinged with bluish slate, and with faint buffy edges to each feather, which are lighter and broader, nearly whitish, on neck and fore part of the crown; forehead buffy white, with the shafts black; a stripe underneath and behind the eye, and a large patch underneath and behind the mouth blackish brown; chin and cheeks buffy white, the latter with blackish brown longitudinal stripes. Lower surface blackish brown, with buffy white edges on each feather which, besides, is crossed by one or two broad angular bars of similar color, the angle pointing towards the tip of the feather; these cross-bars are concealed, however, by the overlying feathers; on the abdomen and flanks these bands are reduced to rounded spots situated near the margin of the feathers and somewhat exposed; under tail-coverts buffy white with black transverse bars. Upper aspect of the wing similar to the rest of the upper surface, each primary having numerous buff transverse spots on the inner web towards the margin; under wing-coverts like the under surface of the body, except that the whole margin and not the edges alone are light colored, and that the angle of the light cross-bar points towards the base instead of the tip of the feathers. Tail brownish black tinged with slate gray, with buff-colored transverse spots along the margin of the inner webs, and corresponding dots of the same color on the outer webs; all tail-feathers narrowly tipped with whitish. First primary equal to third, and 10^{mm} shorter than the second, which is longest; fourth 23^{mm} shorter than third.

♀ *jun.* (*Bering Island.*)

Agrees closely with the foregoing in general coloration, but the under wing-coverts show less light, the buffy margins and spots being much narrower. On the under side of the body the pattern of the individual feather is somewhat different, as those of the breast have the concealed angular cross-bands reduced to marginal spots, while those on the belly, as a rule, have only such a spot left in one of the webs, and often wanting altogether. First primary 2 to 3^{mm} longer than third, and about 7^{mm} shorter than second, which is longest; fourth 24^{mm} shorter than third; inner web of first only sinuated.

93. Archibuteo lagopus (Brünn.).

1764.—*Falco lagopus* Brünnich, Orn. Bor., p. 4.—*Accipiter l.* Pallas, Zoogr. Ross. As., I, p. 360 (1826).—*Buteo l.* Middened., Sibir. Reis., II, 2 (p. 126) (1853).—Dybow., Bull. Soc. Zool. France, 1883, p. 351.—*Archibuteo l.* Dall. & Bannist., Tr. Chic. Acad., I, 1869, p. 272.—Taczan J. f. Orn., 1872, p. 347.—*Id.*, Bull. Soc. Zool. France, 1876, p. 123.—*Id.*, *ibid.*, 1883, p. 330.—*Id.*, Orn. Faun. Vost. Sibir., p. 10 (1877).—Blakist. & Pryer, Ibis, 1878, p. 248.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 238.—*Id.*, *ibid.*, X, 1882, p. 182.—Blakist., Amend. List B. Jap., p. 67 (1884).—*Aquila l.* Seeb., Ibis, 1884, p. 43.

1882.—*Archibuteo lagopus sancti-johannis* Bean, Pr. U. S. Nat. Mus., V, July 25, 1882, p. 162 (*nec* Gmel.).—Nelson, Cruise Corwin, p. 79 (1883).

The Rough-legged Buzzard did not put in its appearance during my sojourn, and it was only with a query that my manuscript notes referred to this species as being probably the "brown hawk," which the natives told me was occasionally seen. A fine specimen was, however, included in the valuable collection which Mr. Grebnitski had the kindness to send me in 1884, thus insuring beyond doubt the correctness of the identification. As yet, the species is only an occasional visitor to

TABLE III.—*Specimens from Southern Alaska.*

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Culmen from cere.	Radius of curvature of culmen from cere.	Height of upper mandible at fore border of cere.	External chord of hind claw.
70093	Pansalin...	(♀) ad.	Kodiak	.. ..	635	313	51	30	27	40
45835	Bishoff....	(♀) ad.	Sitka.....	Feb., 1866	650	302	54	33	29	41
45838	Bishoff....	(♂) ad.	....do.....	Jan., 1866	635	296	50	30	27	39
70094	Bishoff....	ad.	Kodiak	.....	645	305	53	32	29	43
45836	Bishoff....	(♂) jun.	Sitka.....	Apr., 1866	615	305	51	30	26	38

It will be seen that the difference between the dimensions of the specimens of Table I and those of Table II is quite considerable, the females of the latter being about the size of the males of the former. A comparison of the specimens furthermore shows, that there is a not less marked difference in color. The adults from Bering Island lack the peculiar chocolate brown characteristic of the southern birds, the brown of the former being rather a smoky brownish black.

So far the two apparent forms seem easily distinguishable, but here the specimens, the dimensions of which are given in Table III come in between, and, in this case especially, the uncertainty in regard to the sex interferes, making it impossible to reach a conclusion. Two specimens are labeled "♂," two others are said to be "♀," but here is evidently an error, for it can hardly be doubted that Nos. 70093 and 45838 are of the same sex, notwithstanding the statement of the collectors to the contrary, and I am strongly inclined to think that all the five birds enumerated in Table III belong to the same sex. But here is where the difficulty comes in, for it depends upon their sex to which of the above forms they are referable; their size is about that of the males from Bering Island and that of the females from the south, so that they belong to the former group if males, to the latter if females. Nor does the color help us out of the difficulty. The Kodiak and Sitka birds are darker than southern specimens, though still perceptibly "chocolate" brown. At present, however, I am inclined to regard these birds as belonging to the southern race.

Finally I submit the "remarks" relating to the specimens collected by me.

No. 92739.—Bill black; lower mandible and cere very dark olive gray, corner of mouth orange. Feet vivid yellow.

No 92740.—Total length, 893^{mm}; tail beyond tip of closed wings, 77^{mm}; stretch of wings, 2.188^{m}. Weight, 10¼ pounds. Stomach empty. Exceedingly fat.

No. 92741.—Total length, 1.010^{m}; tail beyond closed wings, 105^{mm}; stretch of wings, 2.330^{m}. Weight, 14¼ pounds. Bill horny black; towards the base fading into yellowish; cere dark olive; corner of mouth yellowish orange; naked eye-ring yellow. Feet golden yellow. Stomach empty. Exceedingly fat.

The Bald Eagle is not so abundant on Bering Island as it used to be, judging from the numerous deserted nests which are pointed out by the natives, and it is only in the southern and more mountainous part of the island that one is now sure to find it. My researches have proven that this is the eagle of which Steller speaks as inhabiting the island, and not *Thalassoaëtus pelagicus*, as Pallas erroneously supposed. Thinking it of interest to embody all the results of my investigations here, I simply reprint the following from my preliminary report, having no additional evidence to offer:

"Steller, in his description of Bering Island, mentions a sea eagle in the following terms: 'Von seltnern, an der sibirischen Küste nicht gesehenen Vögeln habe ich dort [Bering Island] einen besondern Seeadler mit weissem Kopf und Schwanz * * * angetroffen * * * jener nistet auf den höchsten Felsen, und sie haben im Anfang des Junius Junge, die ganz mit weisser Wolle bedeckt sind.' This is the same bird of which he speaks in his 'Beschreibung von dem Lande Kamtschatka' (1774), pp. 193–194, as follows: 'Eine Art unbekannter und sehr schöner Adler, so aber in Kamtschatka viel seltsamer vorkommen als in America und den Inseln im Canal, dahero auch solche bis diese Stunde noch nicht erhalten können. Es ist derselbe so gross als der *Haliætus*, ganz schwarz, ausgenommen den Kopf, *Uropygium*, schwarze Füsse* und Schenkel, welche so weiss als Schnee sind. Er macht sein Nest auf hohen Felsen, aus Reisern im Diameter von einen Faden einen Schuh dicke und legt seine Eyer gegen den Anfang des Junii, zwey an der Zahl. Die Jungen sind ganz weiss, ohne einige Flecken; und stiesen die beyde Eltern, da ich auf Bärings Eilande das Nest besahe, dergestalt auf mich zu, dass ich mich kaum ihrer mit dem Stock erwehren konnte. Ohnerachtet ich den *Pullo* keinen Schaden zugefüget, verliesen die Alten dennoch das Nest und baueten sich ein anderes an einen Felsen wohin niemand möglich zu kommen.'

"I think there can be little doubt that the bird thus described is a

* This is completely senseless. I conjecture it to be a misprint for "Schwanzedern."

tus leucocephalus (Linn.) in spite of the white 'thighs,' which
s is only a *lapsus calami* of the person copying the original
cript, this being, as we know, only a rough draft of Steller's, in
n with the 'black feet.' The following are my special reasons:
habitat given by Steller agrees exactly with that of *H. leucoce-*
, while *T. pelagicus* is common in Kamtschatka, and does not oc-
all in America; 2. 'White head' can only be said about *leucoce-*
and not of *pelagicus*, which has merely the forehead white; 3. If
had intended to describe the *pelagicus* he would not have over-
the white shoulders, a much more conspicuous feature than the
forehead; 4. Even if Steller's manuscript contained the words
s white' it would be of little importance, as it seems that he
t kill the bird and only made the description from the living
l. In *pelagicus* the whole abdomen is white. The supposition
dvanced seems the more plausible, as a pair certainly belonging
s species still breeds in the neighborhood of the place where
and his comrades wintered." (Proc. U. S. Nat. Mus., VI, 1883,

95. Haliæetus hypoleucus RIDGWAY.

Haliæetus sp. STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 67.
Haliæetus hypoleucus "Stejneger MSS.," RIDGW., Pr. U. S. Nat. Mus., 1883, p. 90.—STEJNEGER, Naturen, 1884, p. 8.
Haliaëtus albicilla subsp. *hypoleucus?* GURNEY, List Diurn. B. Prey, p. 58.

type specimen of the present species is still unique, and its status
uently somewhat doubtful. But, before proceeding to discuss it,
ginal description by Mr. R. Ridgway may be advantageously re-
l as follows:

ung ♀ (No. 89127, collector's No. 1055, Bering Island, May 15,

Ground color of pileum, nape, upper back, rump, with lesser
iddle wing-coverts dirty white, spotted with grayish brown, the
of the latter color being chiefly subterminal, but often occupying
s of the feathers; upper part of rump with white largely pre-
ating; greater wing-coverts and longer scapulars uniform dusky,
ed terminally with mottled dirty grayish white; tertials uniform
usky; upper tail-coverts mottled dusky terminally, mottled white
y; remiges uniform brownish black; rectrices blackish dusky, the
webs much mottled with pale grayish and buffy white. Side of
with a broad and distinct stripe of nearly uniform brown, occupy-
e entire orbital and auricular regions. Entire lower parts white,
e feathers with distinct dusky shafts; those of throat streaked

with pale brown, those of jugulum and upper breast with a large terminal spot of dusky, many of the feathers of sides and abdomen with small and usually indistinct brown terminal spots; thighs and crissum dirty white, the feathers with dusky terminal spots, these largest on crissum, and on upper and inner portions of thighs coalesced so as to form the predominating color. Under side of wing white, spotted with dusky." (Proc. U. S. Nat. Mus., VI, 1883, p. 90.)

My remarks on the fresh bird read as follows:

Iris faint yellowish white. Bill horny brown; cere yellow, on culmen shaded with horny brown. Feet vivid golden yellow.

Dimensions.—Total length, 890^{mm}; stretch of wings, 2.220^{m}; wing, 630^{mm}; tail-feathers, 322^{mm}; culmen from cere, 56^{mm}; radius of curvature from cere to tip, 35^{mm}; height of upper mandible at fore border of cere, 29^{mm}; external chord of hind claw, 44^{mm}.

In my preliminary report (Proc. U. S. Mus., VI, 1883, p. 67), when comparing it with the young of *H. leucocephalus*, I stated that "the size is not inconsiderably less than that of the bald eagle, as the specimen in question represents the largest size of its kind, being not larger than an old male of the said species. The bill is fully equal in size to that of a young *leucocephalus*, and the feet likewise; but the body, tail and wings are smaller."

My friend, Mr. R. Ridgway, on the other hand, thought that it compared better with the adult male of *H. albicilla* "as for size and proportions" (*l. c.*, p. 91, foot-note), at the same time indicating as a possibility that it might be "the eastern representative" of the latter (*l. c.*, p. 90), a statement which has evidently induced Mr. Gurney to reduce it to a subspecies, as *H. albicilla hypoleucus*, though adding a query, it is true. Mr. Ridgway, however, has now reversed his opinion after having seen the enormous eagles which I brought back from Bering Island, the subjects of my comparison, while at the time, when he wrote his remarks, he had only specimens of the much smaller form for comparison. His remarks, that the "bill and feet are much larger than in a specimen of the bald eagle of equal size so far as other measurements are concerned," are therefore in complete harmony with those of mine, that "the size is in some respects inferior to that of the bald eagle, the bill holding fully the size of that of a young *H. leucocephalus*, and the feet likewise, but the body, the wing, and tail being smaller." What we both wished to express and emphasize was the disproportion between the dimensions of the other parts and those of the bill and feet.

In this connection I will call attention to another character of the

specimen under consideration, in which it differs from all the other specimens of both *H. leucocephalus* and *albicilla*, viz, the great length of the culmen of the cere, as also the great breadth of the back of the bill, just between the horny part and the frontal feathering. The former dimension is 20^{mm}, and the latter, as measured at the middle, is 13^{mm}, figures considerably larger than the maximum dimensions of even the most gigantic specimens at my command.

No satisfactory explanation having as yet been found for the curious concomitancy of the new dark tail-feathers with the yellowish irides and the rather light colored cere, I only reiterate Mr. Ridgway's remarks (l. c., p. 91, foot-note):

"The middle rectrices have been moulted, and those of the new dress are just making their appearance. *They are even darker in color than the old ones*, although similarly marked, which would indicate either that the individual in question would not have attained its perfect plumage the next year, or else that the adult does not have a white tail. That the specimen is not in its first year is clearly indicated by the character of the plumage, as well as by the date of its capture (May 15); while that it is probably more than two years old is strongly suggested by the light color of the bill and cere which in *H. albicilla* and *H. leucocephalus* do not become yellowish until the bird begins to assume a portion of its adult livery."

The most striking feature of the bird, however, is the general white color of the plumage, and after having examined the ample material of the National Museum I must still repeat what I said when first calling attention to the bird, viz, that "I have never seen a young *Haliæetus* with the whole lower surface almost white, and the upper side with dark tips and edgings on a whitish bottom, such as my No. 1055." (*L. c.*, p. 67.)

It is but fair to state, however, that I have seen a bird, a young female *leucocephalus*, which was shot in Virginia April 8, 1884, by Col. M. McDonald, which, in regard to general coloration, is intermediate between the average style of *leucocephalus* and my bird. Still there is a considerable distance between the two specimens. They are apparently of about the same age, but the Virginia bird had the usual dark bill and cere, and brown irides, and the proportions, both of body and bill, are normal.

If the present bird is nothing more than a very extraordinary individual variety of *H. leucocephalus*, its true habitat is somewhere outside

of Bering Island, to which island it then comes as an accidental visitor only. It should especially be looked for toward the northern part of Kamtschatka, since in that country there is a vague rumor that white-bellied eagles live on the great Karaginski Island. It must be borne in mind that Kamtschatka is peculiar for the development of the white color in the plumage of its birds, a very interesting instance of which is the pure white *Astur candidissimus* DYB.

The negative fact that I did not procure more than the single specimen is therefore no evidence against the validity of the species. It will be seen that nothing has happened since the establishment of the name that changes its status. The same reasons for supposing it to be distinct then, exist to-day.

Haliætus hypoleucus is therefore retained for further attention and investigation.

96. Haliæetus albicilla (LIN.).

1758.—*Falco albicilla* LIN., S. N., 10 ed., I, p. 89.—KITTL., Kupfert., I, p. 4, pl. ii, fig. 2 (1832).—*Id.*, Denkwürd., II, p. 278 (1858).—*Aquila a.* PALLAS, Zoogr. Ros. As., I, p. 347 (1826).—*Haliætus a.* TEMM. & SCHL., Faun. Jap. Av. (p. 1-3) (1847).—SCHRENCK, Reis. Amurl., I, p. 223 (1860).—TACZAN., Bull. Soc. Zool. France, 1876, p. 120.—*Id., ibid.*, 1883, p. 329.—BLAKIST. & PRYER, Ibis, 1878, p. 247.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 237.—*Id., ibid.*, X, 1882, p. 180.—BOLAU, J. f. Orn. 1880, p. 114.—BLAKIST., Chrysanthemum, 1882, p. 427.—*Id.*, Amend. List B. Jap., pp. 19, 66 (1884).—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 351.—STEJNEGER, Naturen, 1884, p. 8.

I did not myself succeed in getting a specimen of this species during my sojourn at the islands, and was consequently highly gratified by receiving the following year a specimen from Mr. Grebnitski. This was the more welcome as it was an adult male, so that there cannot be a possible doubt as to the identity of the species. On Bering Island the species is only an occasional visitor from Kamtschatka.

The specimen was particularly acceptable, since I was thereby enabled to ascertain the value of the statement of Kittlitz, that the Kamtschatkan specimens, collected by him, were much paler than European birds. I was the more prepared to suspect the eastern birds of being distinct, since Pallas, in speaking of a Kamtschatkan variety which he considers different, asks: "An species distincta?"

The specimen collected by Mr. Grebnitski contradicts entirely the statements of v. Kittlitz and Schrenck (*l. c.*), it being so far from lighter than average European specimens that the new feathers which are coming out seem to be unusually dark. The remains of the old plumage are very bleached, however, and as v. Kittlitz's specimens prob

ably were obtained during the latter part of the summer, bleaching may account for their lighter color. (Cf. that Schrenck's very dark birds were obtained in January and February.) As to the differences pointed out by Pallas (Z. R. A., I, p. 317), who seems chiefly to refer to the form of the tail, I can only state, that I am unable to see them.

A glance at the subjoined dimensions will convince us that the specimen is very small, not exceeding the average of the smaller Central European form. This fact is particularly interesting when we consider that it is in this very region that *H. leucocephalus* obtains its greatest development. The *H. albicilla* from Bering Island looks like a pygmy alongside its gigantic white-headed cousins.

"♂" ad.—*U. S. Nat. Mus. No.* 101199; *Grebnitski No.* 61. *Bering Island, November,* 1883.

Wing, 608mm; tail-feathers, 258mm; culmen from cere, 51mm; radius of curvature from cere to tip, 27mm; height of upper mandible at fore border of cere, 26mm; external chord of hind claw, 39mm.

97. Thalassoaëtus pelagicus (Pall.).

1826.—*Aquila pelagica* Pall., Zoogr. Ross. As., I, p. 343, pl. 1.—Kittl., Kupfert., I, p. 3, tab. ii, fig. 1 (1832).—*Id.*, in Lütke, Voy. aut. Monde, Atlas, Part. hist. pl. xiii.—*Id.*, Denkw., I, p. 330; II, pl. ad p. 364 (1858).—Middend., Sibir. Reis., II, 2 (p. 125) (1853).—*Haliætus p.* Temm. & Schleg., Faun. Jap. Av. (p. II, pl. iv) (1847).—Cassin, Illustr. Birds, p. 31, pl. vi (1854).—Schrenck, Reis. Amurl., I, p. 222 (1860).—Schleg., Mus. P. B. Aquilæ, p. 14 (1862).—Swinhoe, P. Z. S., 1863, p. 260.—*Id. ibid.*, 1871, p. 339.—*Id.*, Ibis, 1874, p. 150.—Homeyer, Journ f. Orn., 1868, p. 248.—Przewalski, Putesch. Ussuri, Suppl. (p. 52) (1870).—Finsch, Abh. Brem., Ver., III, 1872, p. 24.—Dall, Avif. Aleut. Isl. west Unal., p. 4 (1874).—David & Oust., Ois. Chine (p. 13).—Taczan., Journ. f. Orn., 1876, p. 190.—*Id.*, Bull. Soc. Zool. France, 1876, p. 120.—*Id.*, *ibid.*, 1883, p. 329.—*Id.*, Orn. Faun. Vost. Sibir., p. 8 (1877).—Blakist. & Pryer, Tr. As. Soc. Jap., VIII, 1880, p. 238.—*Id.*, *ibid.*, X, 1882, p. 180.—Blakist., Chrysanthemum, April, 1883.—*Id.*, Amend, List B. Jap., p. 66 (1884).—Seebohm, P. Z. S., 1884, p. 409.—*Thalassoaëtus p.* Stejneger, Pr. U. S. Nat. Mus. 1883, p. 65; Auk, 1884, p. 82.—*Id.*, Naturen. 1884, p. 7, fig.—Dybowski, Bull. Soc. Zool. France, 1883, p. 351.

1830.—*Falco leucopterus* Temminck, Pl. Color., I, pl. 489.

1832.—*Falco imperator* Kittlitz, Kupfert., I, p. 3.

1864.—*Aquila ossifraga* Kittlitz, Denkwürd., II, pp. 366, 406 (*nec* Brünn., 1764).

As I have shown elsewhere (Pr. U. S. Nat. Mus., VI, 1883, p. 66, and this work under *Haliætus leucocephalus*), Pallas was very much mistaken in giving Bering Island as the true habitat of this bird. This mistake arose from his having misunderstood Steller's description of the bald eagle as referable to *Th. pelagicus*. The habitat is especially the mainland of Kamtschatka, where it is abundant, but also all the countries bordering the Okotsk Sea.

On Bering Island it is only an occasional visitor, being chiefly an inland bird preferring the quiet rivers and lakes surrounded by dense forests. During my sojourn on the islands two individuals were reported as seen, one early in the spring, the other about the 8th of June, 1883. A specimen obtained by Mr. Grebnitski the year previous to my arrival was examined by me, and the measurements are embodied in the following—

Table of dimensions.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Total length.	Wing.	Tail-feathers.	Culmen, from cere.	Radius of curvature of bill from cere to tip.	Tarsus.	Middle toe without claw.	Height of bill at fore border of cere.	External chord of hind claw.	Graduation of tail.
				1883.	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
92732	2057	♂ ad.	Petropaulski, Kamtschatka.	May 24	962	600	320	63	39	99	74	35	43	11
92733	2043	♂ ad.	....do.....	May 21	954	610	320	65	....	98	...	37	45	1
92731	2062	♀ ad.	....do.....	May 25	1042	648	320	70	44	102	...	40	48	1
92735	2185	ad.	.. do.....	June —	.....	630	330	67	....	103	82	38	45	
92736	2309	ad.	....do.....	July —	.....	590	315	66	39	.....	..	36	43	1
92737	2308	ad.	....do.....	July —	.....	585	300	66	41	97	75	37	42	
92734	2310	ad.	....do.....	July —	.....	605	313	67	....	97	67	37	43	
92738	2311	juv.	....do.....	July —	.....	255	65	53	35	.....	....	32	37	..
	Greb.	.....	Bering Island.	.....	"910"	630	340	68	41	.....	....	37	44	..

No. 92732.—Tail beyond closed wings, 120mm; stretch of wings, 2.220m. Iris, cream color. Bill, cere, and naked eye-space, as also the feet, intense golden yellow, bill tending to orange, and with trace of dusky. Testes small. Not fat.

No. 92733.—Tail beyond closed wings, 115mm; stretch of wings, 2.250m. Iris pale cream color. Bill, cere, and naked eye-space orange yellow, slightly dusky at tip of upper mandible. Feet yellow, tarsi somewhat paler; claws horny, bluish gray. Testes small, not swollen. Not fat. Weight, 12 pounds.

No. 92731.—Tail beyond closed wings, 110mm; stretch of wings, 2.360m. Iris, yellowish cream color. Bill, cere, and naked space of face yellow, the bill somewhat tinged with orange. Feet bright golden yellow; claws horny whitish, blackish only along the back. A naked "breeding patch," 140 by 90 on the anterior part of the belly. Ova very small, only a few being swollen, and measuring about 8. Rather fat.

A most interesting specimen is No. 92738, a downy young, just assuming the first plumage, the feathers coming out copiously on head, upper neck, interscapular region, wings, breast, anal region, and tail. The predominant color of the feathers is a dull blackish brown, slightly lighter brownish on the middle of the feathers of the top of the head; the inner webs of the wing-coverts are lighter, some at the base whitish, secondaries and scapulars margined with lighter brown. The tail-feathers, of which only the tips are visible, are white near the end, mottled with blackish further up. The down covering the rest of the body

is of a smoky brownish gray. It will be seen from the table of measurements that the bill is as big as that of a full grown *Haliæetus leucocephalus*, notwithstanding the fact that the knob at the tip of the upper mandible has not yet disappeared. The lores are naked, with only a few scant bristles.

During the first days of June, 1883, after I had left Petropaulski, one of the natives secured for me the contents of a nest and one of the parents, No. 92735. In the nest were two eggs containing nearly hatched young, and as the hunter accidentally broke one of the eggs, he only sent me the fœtus in alcohol. The down of the latter (No. 92990) is pure silky white all over.

98. Pandion haliætus (LIN.).

1758.—*Falco haliætus* LIN., S. N., 10 ed., I, p. 91.—KITTL., Denkw., II, p. 197 (1858).—*Accipiter h.* PALLAS, Zoögr. Ross. As., I, p. 355 (1826).—*Pandion h.* SCHRENCK, Reis. Amurl., I, p. 227 (1860).—SWINHOE, Ibis, 1860, p. 46.—*Id.*, *ibid.*, 1861, p. 24.—*Id.*, *ibid.*, 1863, p. 209.—*Id.*, *ibid.*, 1865, p. 347.—*Id.*, *ibid.*, 1870, p. 86.—*Id.*, *ibid.*, 1874, p. 426.—*Id.*, P. Z. S., 1863, p. 260.—*Id.*, *ibid.*, 1871, p. 340.—RADDE, Reis. Süd. Ost-Sibir., II (p. 97) (1863).—PRZEW., Putesch. Ussuri (p. 52) (1870).—TACZAN., Journ. f. Orn., 1872, p. 346.—*Id.*, Bull. Soc. Zool. France, 1876, p. 121.—*Id.*, *ibid.*, 1882, p. 384.—*Id.*, Orn. Faun. Vost. Sibir., p. 9 (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 247.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 238.—*Id.*, *ibid.*, X, 1882, p. 181.—BLAKIST., Chrysanthemum, September, 1882, p. 427.—*Id.*, *ibid.*, January, 1883, p. 36.—*Id.*, Amend. List B. Jap., p. 66 (1884).—BOLAU, Journ. f. Orn., 1882, p. 330.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 351.—SEEBOHM, Ibis, 1884, p. 183.

The Osprey, like the other raptores feeding on salmon, is very abundant in Kamtschatka. To the islands, however, this species only comes as an occasional visitor. A specimen was recorded, as seen on Bering Island, May 24, 1883, during my absence in Petropaulski, where, as will be seen from the list of specimens collected, on the same day I secured two specimens, it being then very numerous at the few open places on the rivers and along the coast.

It will be seen from the measurements given below that the eastern birds are not smaller than European examples. Two Japanese specimens in the collection are still larger, so that the existence of a smaller race, "*orientalis*," in Japan seems to be out of the question, as already remarked by Captain Blakiston.

With the Japanese specimens those collected by me agree very well as to color, the spots on the breast being even darker and larger, if anything, in the latter, and the shafts of the rectrices are brown at the lower end. They are consequently referable to the Old World typical

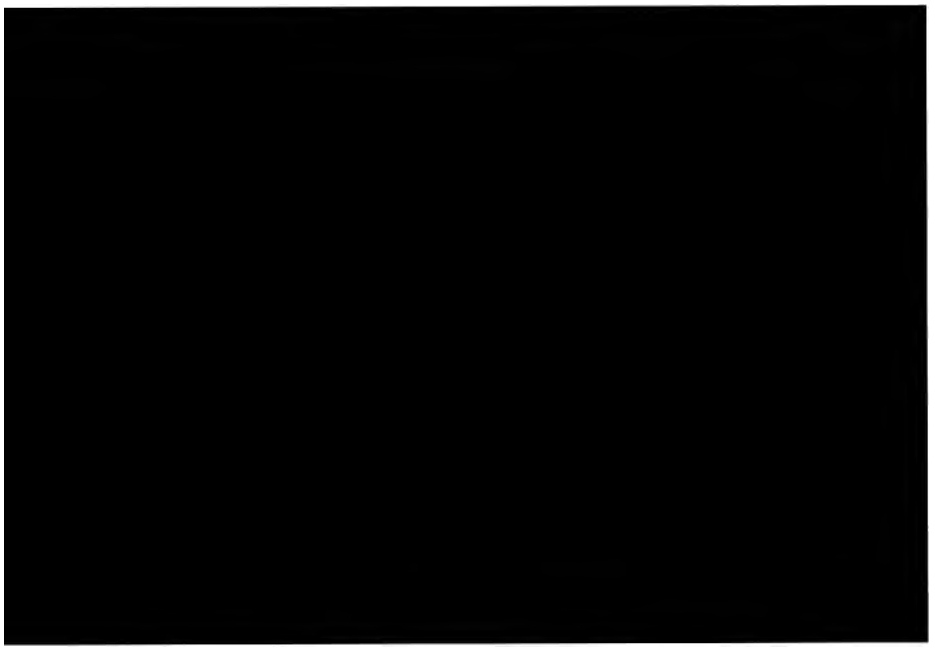
kaliaetus, and very easily distinguishable from the North American *carolinensis*. Third primary in all the specimens is longer than the second.

In my specimens the iris was of a clear yellow without orange. Mr. Ridgway assures me that in the two specimens of the American bird (*carolinensis*) he has collected the irides were scarlet (cf. Hist. North Amer. B., III, p. 184, foot-note). I should like to be informed whether the Old World form at any age has a similarly colored iris.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Culmen from cere.	Tarsus.	Middle toe without claw.	Total length.
					mm.	mm.	mm.	mm.	mm.	mm.
92727	2051	♂ ad.	Petropaulski, Kamtschatka.	May 23, 1883	494	204	30	59	45	543
92728	2075	♂ ad.	.....do	May 24, 1883	480	200	30	59	.....	535
92730	2080	ad.	.....do	May 24, 1883	465	200	30	57	43	530
92729	2035	♀	Velutschka, Kamtschatka.	Sept. 21, 1883	480	218	34	58	46	.....
101000	.....	ad.	Petropaulski, Kamtschatka.	.... .., 1884	485	202	32	59	44	.....

No. 92727.—Wings beyond tip of tail, 37mm. Iris bright yellow. Bill in front of nostrils black; at base, cere, and mouth grayish blue sharply contrasted with the black tip; naked skin above the eye somewhat lighter grayish blue; eye-ring blackish. Feet very light blue with a greenish tinge; anterior border of the distal scales of the toes, as also the claws, blackish.



haliætus, and very easily distinguishable from the North American *linensis*. Third primary in all the specimens is longer than the se

In my specimens the iris was of a clear yellow without orange. Ridgway assures me that in the two specimens of the American (*carolinensis*) he has collected the irides were scarlet (cf. Hist. North A B., III, p. 184, foot-note). I should like to be informed whether th World form at any age has a similarly colored iris.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Culmen from cere.	Tarsus.	Middle toe without claw.
					mm.	mm.	mm.	mm.	mm.
92727	2051	♂ ad.	Petropaulski, Kamtschatka.	May 23, 1883	484	204	30	59	45
92728	2075	♂ ad.	.....do	May 24, 1883	480	200	30	59	.....
92730	2060	ad.	.....do	May 24, 1883	465	200	30	57	42
92729	2635	♀	Velutschka, Kamtschatka.	Sept. 21, 1883	490	218	34	58	46
101660	.....	ad.	Petropaulski, Kamtschatka.	.... .., 1884	485	202	32	59	44

No. 92727.—Wings beyond tip of tail, 37mm. Iris bright yellow. Bill in front of nostrils bla base, cere, and mouth grayish blue sharply contrasted with the black tip; naked skin above t somewhat lighter grayish blue; eye-ring blackish. Feet very light blue with a greenish anterior border of the distal scales of the toes, as also the claws, blackish.

Superfamily STRIGOIDEÆ.

Family STRIGIDÆ.

99. Asio accipitrinus (PALL.).

1771.—*Strix accipitrina* PALL. Reise Russ. Reichs, I, p. 455 (*nec* BECHST.).—*Asio a trinus* NEWTON in Yarrell's Brit. Birds, 4 ed., I, p. 163 (1872).—BLAKI PRYER, Ibis, 1878, p. 246.—*Id.*, Trans. As. Soc. Jap., VIII, 1880, p. 236.· *ibid.*, X, 1882, p. 178.—SEEBOHM, Ibis, 1879, p. 41.—NELSON, Cruise Corw 75 (1883).—BLAKIST., Amend. List B. Jap., pp. 18, 65 (1884).—TURNER, 1885, p. 157.—MURDOCH, Auk, 1885, p. 201.

1772.—*Strix brachyotus* I. R. FORSTER, Phil. Trans., LXII, p. 384.—MIDD., Sibir. Reis 2 (p. 130) (1852).—SCHRENCK, Reise. Amurl., I, p. 246 (1860).—RADDE, en Süd. Ost-Sib., II (p. 122) (1863).—*Otus b.* SWINHOE, Ibis, 1861, pp 327.—*Id. ibid.*, 1863, p. 89.—*Id.*, P. Z. S., 1863, p. 262.—*Id, ibid.*, 1871, p. 3 WHITELY, Ibis, 1867, p. 195.

1791.—?*Strix palustris* BECHST., Gem. Naturg. Deutschl., II (p. 344).—*Brachyotus p.* DYBOW. & PARVEX, J. f. Orn., 1868, p. 331.—TACZAN., J. f. Orn., 1872, p. 350.—*Id.*, *ibid.*, 1874, p. 334.—*Id.*, Bull. Soc. Zool France, 1876, p. 132.—*Id.*, Orn. Faun. Vost. Sibir., p. 18 (1877).—DALL., Notes Avif. Aleut. Isl. west Unal., p. 4 (1874).—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 355.

1826.—*Strix ægolius* PALL., Zoogr. Ross. As., I, p. 309.

1856.—*Brachyotus cassini* BREWER, Proc. Boston Soc. Nat. Hist., 1856 (p. 321).—DALL & BANNIST., Trans. Chic. Acad., I, 1869, p. 273.—DALL, Notes Avif. Aleut. Isl., Unal. eastw., p. 2 (1873).

This owl seems to be a resident, though not very numerous, and rather rare in winter. It was observed frequently in May and June, 1883, near the village on Bering Island, and the natives of Copper Island informed me that they use to see it in Pestschanij Valley, when, in August, they dig for the roots of the Saranna lily.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Sex and age.	Locality.	Date.	Wing.	Tail.	Wings beyond tip of tail.	Total lenght.
					mm.	*mm.*	*mm.*	*mm.*
92753	1759	♂ ad.	Bering Island	Nov. 25, 1882	312	148	.....	363
92754	1831	.....	.....do	Dec. 30, 1882	.....	.....	.....	352
92756	2120	♂ ad.	.....do	June 3, 1883	320	145	20	387

No. 92753.—Iris light yellow. Bill and cere horny black.
No. 92754.—Iris bright yellow.
No. 92756.—Iris bright yellow. Stomach contained remains of *Arvicola rutila*. Testes large, swollen.

100. Nyctea nyctea (LIN.).

1758.—*Strix nyctea* LIN., Syst. Nat., 10 ed., I, p. 93.—PALL. Zoogr. Ross. Asiat., I, p. 312 (1826).—MIDDEND., Sibir. Reise, II, 2 (p. 130) (1853).—SCHRENCK, Reise. Amurl., I, p. 247 (1860).—RADDE, Reisen Süden Ost-Sibir., II (p. 124) (1863).—*Surnia n.* PRZEW., Putesch. Ussur. (p. 52) (1870).—*Nyctea n.* LICHT., Nom. Mus. Berol., p. 7 (1854).—TURNER, Auk, 1885, p. 157.

1798.—*Strix nivea* THUNB., Sv. Vet. Acad. Förhandl., 1798 (p. 184).—*Nyctea n.*, DYBOW. & PARVEX, J. f. Orn., 1868, p. 331.—TACZAN., J. f. Orn., 1872, p. 349.—*Id.*, *ibid.*, 1874, p. 334.—*Id.*, Bull. Soc. Zool. France, 1876, p. 129.—*Id.*, *ibid.*, 1883, p. 332.—*Id.*, Orn. Fauna. Vost. Sibir., p. 16 (1877).—DALL & BANN., Trans. Chic. Acad., I, 1869 (p. 273).—DALL, Avif. Aleut. Isl. Unal. eastw., p. 2 (1873).—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 355.

1872.—*Nyctea scandiaca* NEWT. in Yarr. Brit. Birds, ed. 4, I. p. 187.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 235.—*Id.*, *ibid.*, X, 1882, p. 177.—BEAN, Pr. U. S. Nat. Mus., 1883, p. 161.—NELSON, Cruise Corwin, p. 76 (1883).—BLAKIST., Amend List B. Japan, p. 28 (1884).

The snowy owl is only of late getting to be numerous on Bering Island, and was a few years ago regarded as a rather rare bird, although it was

Order PICARIÆ.

Superfamily CUCULOIDEÆ.

Family CUCULIDÆ.

101. Cuculus canorus telephonus (Heine).

1826.—? *Cuculus borealis* Pall., Zoogr. Ross. As., I, p. 442 (*part*).
1861.—*Cuculus striatus* Swinh., Ibis, 1861, p. 259 (*part; nec* Drap.).
1862.—? *Cuculus swinhoei* Cab., Mus. Hein., IV, i, p. 39 (*part, nom. nud.*).
1863.—*Cuculus telephonus* Heine, Journ. f. Orn., 1863, p. 352.
1871.—*Cuculus canorus* Swinh., P. Z. S., 1871, p. 395.—Blakist. & Pryer, Ibis, 1876, p. 227.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 205.—*Id.*, *ibid.*, X, 1882, p. 130.
1872.—? *Cuculus canorinus* Cab., J. f. Orn., 1872, p. 236.—Taczan., Bull. Soc. Zool. France, 1876, p. 237.
1875.—*Cuculus canorinus* Swinhoe, Ibis, 1875, p. 451.—Stejneger, Naturen, 1882, p. 182.—*Id.*, Pr. U. S. Nat. Mus., 1883, p. 71 (*part*).—Taczan., Bull. Soc. Zool. France, 1882, p. 395.—Dybowski, Bull. Soc. Zool. France, 1883, p. 368.

Most of the English writers agree that they have not been able to separate the Eastern Asiatic bird from *Cuculus canorus* of Europe, while Cabanis, *l. c.*, expressly states as his view, that the latter does not occur in Eastern Asia at all.

The birds which I have collected are easily enough distinguishable from European specimens, and it seems to be the rule that the eastern bird has finer and narrower, dark bars on the lower surface; but as intergradation has been satisfactorily proved, the eastern form can only be designated as a race.

I am rather doubtful whether Cabanis's *canorinus* of 1872 (from Baical), and the birds (from Eastern Siberia generally), designated by Taczanowski by the same name, really belong to our race. The latter author (*l. c.*) describes his specimens as differing from the European form "par les bandes des parties inférieures du corps plus fines et *plus nombreuses*, et les taches blanches sur les rectrices *plus petites*, elles *se marquent complètement sur les médianes*, sur les suivantes elles sont à peine distinctes; les subcaudales sont *plus rayées* de foncé." Now it is the

my birds, that, although the dark bars underneath are finer rower, they are *by no means more numerous;* the whitish spots rectrices are *rather larger*, and are well marked, even on the air, and the subcaudales are not more, but *less*, *streaked* than in pean specimens. But there is one reason more why I cannot le name *canorinus* to the present form, viz, that the bird thus s apparently different from the species to which Cabanis in 1862 y applied the name. The *canorinus* of Museum Heineanum e the same as Müller's *C. canoroides*) is described as being so smaller than *canorus*, besides differing from it by "*subalari-genebre fasciolatis mediis fere unicoloribus tanquam fasciam longi-m albidam formantibus.*" Now Taczanowski expressly states birds are of the same size as those from Europe, and does not the peculiar coloration of the under wing-coverts. In my birds, these feathers certainly are narrowly and uniformly barred. almost seem from the description of Taczanowski, quoted above, Siberian bird forms a separate race, the proper name of which *Cuculus canorus borealis* (PALL.).*

the name applied by me to the Kamtschatkan bird I have to following remarks: In the Ibis for 1861 Mr. Swinhoe described us from Talien Bay as *striatus* DRAP., stating at the same time birds were larger, and had a weaker bill than the Indian spec-These birds he afterwards recognized as erroneously identified, g them then partly to *C. canorus* (*Cf.* Ibis, 1863, p. 395). In the ime Cabanis and Heine had proposed the name *C. swinhoei* for e specimens, under the impression, however, that they belonged us proper, or, at least, *striatus* of Jerdon and of Cabanis, as a But it seems evident from the synonymy (P. Z. S., 1871, p. 395) inhoe, even in 1871, by *striatus* understood a bird widely differ-m that of the two authors quoted above, and partly identical e so-called *C. himalayanus* Jerdon and *C. kelungensis*. Never-it may be safer to reject the name given by Cabanis and since it is based upon no description or already described species, o since it seems that the authors insist upon comparing *C. swin-h striatus* or *micropterus* (cf. J. f. Orn., 1868, p. 355). The next

nly question is, whether it is admissible to restrict Pallas's name thus, as nly partly given to this bird: "*Per universam Rossiam et Sibiriam, etiam in * * * * etiam in Camtschatca adest, * * * Nusquam copiosiorem audiri, Dauuria.*"

name in time, Heine's *C. telephonus*, seems perfectly pertinen based upon a skin from Japan, being "subtus fasciis tenuio paucioribus quam *C. canori* fasciatus.".

The cuckoo is rather numerous in the neighborhood of P ski, where in 1882 I heard its well-known note as late as Jul 1883 it had not arrived when I left the town on the 28th of M iting the same place again in the middle of September I fo they had already departed.

I could not detect the slightest difference in the voice or ha those of the common European form.

On treeless Bering Island this bird only occasionally n appearance during the migrations; although apparently e adapted to live among trees, it is by no means absolutely co places where such occur, for I have several times found its we presentative, during the latter part of June, on the high platea Norwegian mountains above the limit of trees, where it co deposit its eggs in the nests of the ground-breeding *Anthus* and *Saxicola oenanthe*.

Three exemplars were shot the year before I visited the isl on June 13, 1882, I got a single male, which was shot at E Reschka, on the northern shore, while picking up *Gammaridæ* the bowlders of the beach. The stomach was found crammed w crustaceans, a rather strange food for a cuckoo! I had, how same experience with a specimen of the next species.

A native of Germany, who had been residing on Copper I about ten years, stated that he had heard the cuckoo's voice th

List of specimens.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.
					mm.	*mm.*
89056	1201	Bolschaja Reschka, Bering Island	June 13, 1882	♂ ad.	349	225
89145	1243	Petropaulski, Kamtschatka.....	June 30, 1882	♂ ad.	350	226

No. 89056.— Iris yellow. Bill horny black; lower mandible, bluish in the middle, and yel the base; angle of mouth yellow, as also the naked ring round the eye; inside of mouth Feet deep yellow.

No. 89145.— In the stomach was found remains of three or four specimens of a *Bombus*.

In order to show that there is no appreciable difference in dimensions between the two forms, except perhaps in the size of the bill, which seems to be larger in the eastern bird, I submit the following

Table of dimensions.

U. S. Nat. Mus. No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Remarks.
				mm.	mm.	mm.	
9203	♂ ad.	Germany	May —, 1851	219	162	20	
9708	♂ ad.	do		227	162	21	
1803	♂ ad.	France		221	176	22	
9532	♂ ad.	England		218	169	20	
9709	♀ jun.	Germany		204	162	19	
1695		do		210	164		Hepatic phase.

102. Cuculus peninsulæ sp. n.

Diagnosis.—Allied to *Cuculus kelungensis* SWINH., from Japan, but the gray color much lighter, the under surface, including the under tail-coverts, only very faintly tinged with buff; the under wing-coverts nearly white, with faint and few gray cross-bars, and the inner webs of the primaries with more numerous, broader, white cross-spots, and more white at the base.

Dimensions: Total length, 318mm; wing, 197mm; tail-feathers, 144mm.

Type: ♀, U. S. Nat. Mus. No. 89128.

Habitat: Kamtschatka; accidental in the Commander Islands.

Synonymy: 1882.—*Cuculus indicus* TACZANOWSKI, Bull. Soc. Zool. France, 1882, p. 395 (*nec* BLYTH); DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 368.

1883.—*Cuculus canorinus* STEJNEGER, Pr. U. S. Nat. Mus., VI, 1883, p. 182 (*part; nec* CAB.).

Among the stragglers from the mainland to the Commander Islands I got two female cuckoos, which are quite different from the form described on a previous page as *Cuculus canorus telephonus*. One is in the usual gray plumage, while the other represents the hepatic or rufous phase. In those points in which this form differs from the other allies the two skins agree perfectly, leaving no doubt whatever about their belonging to the same species.

Comparing them with the form mentioned above, I find them to differ in the following points:

1. They are considerably smaller.

2. The under wing-coverts are quite differently marked, the middle and smaller ones being uniform white, without bars, while the inner

and larger arm-coverts are marked with some few and distant bars, against the uniform and narrow barring of *canorus*.

3. Only the six first primaries have white cross-bars on their webs, the white bases of the following quills forming a distinct and white speculum on the under surface of the wing. In the other eight primaries at least are distinctly barred, the white speculum much less pronounced. Besides, the white bars are narrower and numerous than in the bird in question; the bars or spots, *e. g.*, o inner web of the first primary are only five in the latter, while i former their number is seven, at least.

4. The dark cross bars of the under surface are more blackish, bro more distant, and, consequently, fewer.

5. The spots on the tail-feathers are rather larger and more dis

The two first points agree with Cabanis's description of *canor* 1862 (the alleged *canoroides* MÜLL.), but his "*subtus fasciis ut* canoro *crebrioribus angustis*," compared with point 4, as above, pre them from being united. It may be that they will turn out to be ra the same species, but at present a decision is hardly possible. It be borne in mind that I consider *C. canorinus* Cabanis of 1862 a *canorinus* Cabanis of 1872 to be two different birds.

This is the same species which Taczanowski and Dybowski r from Kamtschatka as "*Cuculus indicus* Cab.," but I need only qu few words from Cabanis's description (Mus. Hein., IV, i, p. 35), to that his *indicus* does not belong here, as he describes it as "subtu ciis aliquantulum angustioribus seu tenuioribus," and "tectricum larium fasciolis ut in C. canoro tenuissimis creberrimis." This is tainly nothing but the Indian *Cuculus canorus*, which, if really sepa from the European bird, should stand as *Cuculus canorus indica* which name it was originally designated by Blyth (Jour. As. Soc. B 1846 (p. 19)). In fact, the name *indicus* may perhaps finally be f to belong to the foregoing species (*C. telephonus*), from which it see differ chiefly by a somewhat smaller size, and a weaker and shorte

Cuculus peninsulæ comes nearest to the bird which is recorded Japan as *C. himalayanus*, but which I think should properly stand *kelungensis* Swinhoe, or perhaps *C. saturatus kelungensis*. The chie ferences have been mentioned in the diagnosis, the two forms being e distinguished by comparing the under side of the wing, which o whole is much lighter in the Kamtschatkan bird. The difference i number of white bars on the primaries is apparently not so great,

in *C. peninsulæ* the lower ones are fused together, having entirely swallowed up the intervening black spaces; the white spots, in this form, are much broader than the black separating them, while, in the Japanese birds, the proportion between the white and black is exactly the reverse. In dimensions, in the broad and distant bars on the lower surface, and in the scanty barring on the under wing-coverts, the two forms agree very well.

The rufous specimen (No. 92699) has the bars underneath still broader and blacker; the upper surface is more deeply hazel than the corresponding stage of *C. canorus*, the rump being quite chestnut, strongly and broadly barred with black; the brown color descends on the sides of head and neck, and strongly tinges the throat.

As already stated, two stragglers of this species were shot by me on Copper Island, one in 1882 the other in 1883. Both were met on the eastern shore near the beach, the former at the main village, the latter, which was in the hepatic stage of plumage, a little north of the settlement Karabelnij. No note was heard.

Dimensions.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
89128	1213	Copper Island, main village.....	June 19, 1882	♀ ad.	318	.....	197	144	22
92699	2215	Copper Island, Sabatschi Mys, Karabelnij.	July 1, 1883	♀	319	45	188	141	.....

No. 89128 (Gray plumage).—Iris, outer ring cream colored, inner grayish brown. Naked eye-ring bright yellow. Bill horny black; basal third of upper mandible (except nasal tubes) and two-thirds of the lower are yellowish; angle of mouth, and lower jaw along the chin angle, orange yellow. Inside of mouth pale orange-red. Feet light cadmium yellow. Contents of stomach, *Gammaridæ!*

No. 92699 (Hepatic plumage).—Iris light cream colored, inner ring tinged with brownish gray, outer one slightly so with greenish. Bill blackish, bluish gray, lighter on lower mandible; tubercle in the middle of nostrils olive-yellow; angle of mouth and base of lower jaw orange-yellow. Interior of mouth delicate orange-red. Naked eye-ring bright golden yellow. Feet orange-yellow, claw of outer toe dusky. Eggs small.

In Petropaulski I was told of a cuckoo said to be distinguishable from the common one especially by its quite different voice. This is the present species, but I never met with it in Kamtschatka, where it has been collected by Dybowski.*

* *Cf*, also KITTLITZ, Denkwürd, II, p. 198: "Das an unsern Wiedehopf erinnernde Geschrei, das man hier dem Kuckuck zuschreibt, und das auch wirklich neben jenem andern [the common cry of the European cuckoo] von ihm herzurühren scheint."

Superfamily PICOIDEÆ.

Family PICIDÆ.

103.—Dryobates purus STEJNEGER.

1858.—*Picus major* KITTL., Denkw., I, p. 321 (*nec* LIN.).—TACZAN., Bull. S France, 1882, p. 395.

1883.—*Picus major kamtschaticus* DYBOWSKI, Bull. Soc. Zool. France, 18 (nec *Picus kamtschatkensis*, BP.)

1884.—*Dendrocopos purus* STEJNEGER, Auk, 1884, p. 35.

This species is closely related to *D. major* (LIN.), but differs i the breast and upper abdomen very pure white, the white of th rectrices without, or almost without, dark markings, and poss white spot on the outer web of each of the longest primaries nea

The greater purity of the white of the lower surface and the extent of the same color on the lateral tail-feathers distingu species easily from its allies. In the description of *D. cissa* P pressly says that the lateral rectrices are white "nigro transversi gatæ" and "pectore sordescente." Specimens of *D. major* from Europe, the only ones at present accessible to me, have the lat feathers strongly barred, and lack the white spot near the tip outer web of the longest primaries. The markings are, howe found in *Dryobates japonicus* (Seeb.), but the Japanese bird ha dark lower surface, and transverse markings on all the late feathers; besides, the Kamtschatkan form has a stouter and lo

Dryobates purus is especially conspicuous for the uniform wh on the lateral tail-feathers. In two of the specimens are se traces of transverse bars on one or both of the two external feath no traces of similar bars or spots are found on the two followi

The dimensions may be seen from the following

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.
					mm.	*mm.*	*mm.*
92702*	2019	Saranna, Bering Island.....	May 8, 1883	♂ ad.	253	45	147
92701*	2024	Ladiginsk, Bering Island.....	May 9, 1883	♂ ad.	241	43	139
92703*	1700	Severnij, Bering Island	Oct. 26, 1882	♀ ad.	251	.....	132

*Types of *Dendrocopos purus*.

No. 2019, ♂.—Iris crimson. Bill plumbeous, darker above; lower mandible below at base whitish. Feet gray with an olive tinge, not at all bluish. Rather fat. In the stomach remains of a coleopterous insect.

No. 2024, ♂.—Colors as the foregoing. Not fat.

No. 1709, ♀.—Iris carmin-red. Bill bluish gray. Feet same color, only a little darker. Stomach crammed with the white large larvæ of the flesh-fly. "So fat as a woodpecker can possibly be."

The following table of dimensions is added for comparison with the allied forms:

U. S. Nat. Mus. No.	Names of species.	Locality.	Collector's name.	When collected.	Sex and age.	Wing.	Tail-feathers.	Exposed culmen.
						mm.	mm.	mm.
9708	*Dryobates japonicus* ..	Japan.....	Jouy....	July 4, 1882	♂ ad.	131	76	27
9128	.....do	.. do	...do	Nov. 7, 1882	♂ ad.	131	79	26
9129	..... do	... do	...do ...	Nov. 20, 1882	♂ ad.	133	83	25
9130	.....do	....do	...do	Dec. 4, 1882	♀ ad.	129	81	24
9131	.....do	....do	...do	Dec. 12, 1882	♀ ad.	131	83	23
9132	.... do	....do	...do ...	Dec. 12, 1882	♀ ad.	132	85	25
1939	*D. major*.....	France	Drouet..	.....	♂ ad.	147	92	25
1940	.....do	....do	...do ...	.....	♀ ad.	141	89	24

My surprise was very great when, on the 26th of October, 1882, I held in my hand the female of this elegant bird, shot on the killing-ground at the northern seal rookery on Bering Island. It had been seen in the neighborhood for about fourteen days feeding on the enormous masses of the white larvæ of the flesh-fly, with which the whole ground swarms at this season for more than a square mile. In spring again I obtained two more specimens, two males, from different places on the northern part of the island. These birds of the forest are, of course, only stragglers from Kamtschatka, where the species is not uncommon. In the latter part of May and again in September, 1883, I observed several individuals in the neighborhood of Petropaulski.

104. Dryobates immaculatus STEJNEGER.

1858.—*Picus minor* KITTL., Denkw., I, p. 321 (*nec* LINN).

1882.—*Picus kamtschatkensis* TACZAN., Bull. Soc. Zool. France, 1882, p. 396 (*nec* BP.).—DYBOW., Bull. Soc. Zool. France, 1883, p. 368.

1883.—*Dendrocopos immaculatus* STEJNEGER, Pr. Biol. Soc. Wash., II, April 10, 1884, p. 98.

On a previous occasion I have briefly indicated that the *Picus kamtschatkensis* BP. is not the Kamtschatkan bird at all. As will be shown more elaborately below, the form named thus by Bonaparte in 1854 is

only the well-known Siberian bird, Pallas's *pipra*, of which the name, given by Bonaparte, is but a synonym.

The type of his species was a bird "tué le 28 septembre 1853, aux environs d'Okhotsk, sur le bord de la mer asiatique de ce nom," and the locality, Kamtschatka, is only a guess caused by the very erroneous idea that the birds of the peninsula are identical with those occurring on the other side of the wide Okotsk Sea, the same idea that caused the determination of *Parus baicalensis* as *kamtschatkensis*. The description and plate of Malherbe from the type show furthermore, beyond possibility of doubt, that his bird is identical with the Siberian form, having "transverse cordiform spots of a brownish fuliginous color on the under tail-coverts," and the plate shows distinctly two dark cross-bars on the outer tail-feathers, and one on each of the two following pairs, together with a well-marked black subocular stripe. A comparison with Seebohm's description (Ibis, 1880, p. 181) makes the identity apparent. He says: "The under tail coverts are slightly streaked with black; the outside tail-feathers have two rudimentary cross-bars." It would almost seem as if the type in Malherbe's possession had those features even more distinct than the bird described by Mr. Seebohm. Pallas's words agree in the same manner: "*Crisso punctato*" and "*subcaudales guttulis cordatis nigricantibus.*"

The bird which I procured in Petropaulski has no trace of spots on the crissum or the under tail-coverts. On the outermost pair of rectrices, which are white to the very base, is one single rudimentary and narrow cross-bar near the tip, while the two following pairs have none, a just perceptible spot on the margin of the inner webs indicating the place where the bar is situated in allied forms. The fourth pair has a white tip about 5^{mm} broad, beginning on the outer web, about 13^{mm} from the tip. From the base of the lower mandible, in a line with the direction of the bill, the feathers have dark gray bases and pure white tips, thereby forming a rather obsolete grayish malar stripe, mottled with white, scarcely connected behind with the large black patch on the side of the neck. The white space behind the brownish ocular patch is so nearly connected with that on the other side as to almost form a continuous white band across the upper neck. Back white, unbarred. The *whole* lower surface pure white without the *slightest trace* of stripes or spots. The white cross-bars on the inner secondaries are not particularly broad, being only 4^{mm}, and the rounded white spots on the inner

ebs of the primaries are quite separate and not confluent along the ner margin of the quill.

This beautiful bird needs no further comparison with the allied forms ıan is given above. The Japanese form seems to be related to it in a milar way as is *Dryobates minor hortorum* (Brm., 1831) (=*striolatus* LACG., 1840) to the Scandinavian true *D. minor* (Lin.) (=*D. minor borealis* SUNDEV.), and is probably indistinguishable from *D. minor pipra* Pall.) from Siberia. Should intergradation with the Siberian form really occur, the question will arise whether our new form should stand as *D. minor immaculatus* or *D. pipra immaculatus*. This is a point of the trinominal nomenclature which is not yet decided upon by the leading trinominalists.

v. Kittlitz (*l. c.*) states that "*Picus minor* ist hier [Petropaulski, latter part of September] nicht selten, jedenfalls häufiger als der ebenfalls hier einzeln vorkommende *Picus major*" (=my *P. purus*), which is contrary to my experience, as the specimen which I collected was the only one I saw during my stay in Petropaulski. It was shot on the wooded peninsula sheltering the harbor, where it flew restlessly from one birch (*Betula ermani*) to another.

The dimensions of this specimen are:

♀ *ad.*—*U. S. Nat. Mus. No.* 92700, *L. Stejneger No.* 2757. *Petropaulski, October* 9, 1883. Total length, 167^{mm}; tail beyond wings, 24^{mm}; wing, 97^{mm}; tail-feathers, 61^{mm}; xposed culmen, 18^{mm}.

Remarks.—Iris bright hazel. Bill pure gray, darker above; a narrow dark stripe long the gonys. Feet gray, with a light greenish tinge.

ORDER PASSERES.

Family ALAUDIDÆ.

105. Alauda blakistoni STEJNEGER.

1885.—*Alauda cristata* PALL., Zoogr. Ross. Asiat., I, p. 524 (*part*).
1885.—*Alauda arvensis* KITTL., Denkw., II, p. 198 (*nec* LIN.).—TACZAN., Bull. Soc. Zool. France, 1882, p. 389.—DYBOW., Bull. Soc. Zool. France, 1883, p. 361.
1888.—*Alauda cantarella* BLAKIST. & PRYER, Trans. As. Soc. Japan, X, 1882, p. 16 (*nec* BP.).—*Alauda* —— ? BLAKIST., Amend. List B. Jap., p. 50 (1884).
1884.—*Alauda* sp. STEJNEGER, Naturen, 1884, p. 5.
1884.—*Alauda blakistoni* STEJNEGER, Pr. Biol. Soc. Washingt., II, p. 98.

One needs almost apologize when creating a new species among th Palæarctic *Alaudæ*. The group is a most perplexing one, and conside able confusion exists in regard to the East Asiatic forms. But it i thought that the naming of the present bird will tend to clear th confusion which has arisen from the untimely zeal of ornithologists i uniting distinct forms on insufficient evidence. I cannot refer th specimens from Kamtschatka to any form known to me, and I will n be found guilty of applying to them a name which I do not consid properly belonging to them. Taking the name of a form which seem to agree best, but yet not exactly, would only add to the confusion. I this connection it may be proper to remark that the "reducing" a "uniting" of species is often made upon inspection of a single specime but this is a proceeding which, in many cases, proves to be even mo

comes much nearer to the Japanese species, the rusty tinge of which is rather conspicuous. My birds show, however, two very peculiar features, viz, dark blackish brown scapulars and interscapulars, the lighter edges being conspicuous on the inner webs, and the rusty colored hind neck only dotted with small dark spots, forming a light color between the strongly-marked pileum and the dark color of the upper back; besides, the spots on the fore neck and upper breast are smaller and darker, and, consequently, more distinct. The bill is somewhat longer and stouter than in *japonica*.

The specimens from Vladivostok collected by Mr. Jouy and Dr. Dale are paler and smaller, thus being referable to *A. intermedia* SWINH. They seem to occupy the same position to the Kamtschatkan species, as *A. cantarella* BP. (*nec* SWINH., *nec* TACZAN., quæ *intermedia*) does to the typical *arvensis*. The birds from Vladivostok have the dark color of the scapular region more confluent and not so distinctly streaked as *cantarella*. *A. coelivox* is sufficiently distinct by its considerable smaller size.

Lists of measurements of the material examined is added for comparison.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
89027	1020	Bering Island	May 9, 1882	♂ ad.	186	.....	114	76	12
89028	1117	.....do	May 30, 1882	♂ ad.	187	.....	119	74	14
89153	1242	Petropaulski	June 30, 1882	♂ ad.	183	.....	112	70	13
89154	1249	.....do	July 4, 1882	♂ ad.	173	.....	116	68	13
92858	1995	Bering Island	Apr. 19, 1883	♂ ad.	193	.....	115	69	14
92861	2040	Petropaulski	May 19, 1883	♂ ad.	197	26	118	73	13
92859	2049	.....do	May 19, 1883	♂ ad.	187	24	115	71	12
92857	2079	Bering Island	May 13, 1883	(♂) ad.	.....	.....	119	75	13
92862	2041	Petropaulski	May 19, 1883	♀ ad.	187	29	107	70	12
92860	2046	.....do	May 20, 1883	♀ ad.	185	22	110	69	12
		Average measurements of eight males			187	.....	116	72	13
		Average measurements of two females			186	.....	109	70	12

No. 89027.—Iris dark brown. Feet light reddish brown; tarsal joint with a strong tinge of dark gray; toes below livid

No. 89028.—Iris hazel.

No. 89153.—Bill brownish flesh color; tip, culmen, and sides of upper mandible blackish brown. Feet pale reddish brown; tarsal joint dark grayish; nails blackish gray.

No. 92858.—Iris dark hazel. Bill, upper mandible dark-brownish gray; along tomia and whole lower mandible pale yellowish gray. Testes large, swollen.

No. 92861.—Iris brown. Bill horny blackish brown; tomia and back of lower mandible paler, grayish. Feet reddish gray; joints darker gray; below livid. Testes large, swollen. Stomach containing seeds.

No. 92862.—Iris, bill, and feet as foregoing. Largest egg 2^{mm} in diameter.

Tables of dimensions.

A.—ALAUDA JAPONICA.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Wing.	Tail-feathers.	Exposed culmen.
						mm.	mm.	mm.
91464	Jouy	911	Yokohama	Jan. 3, 1883	♂ ad.	106	63	1
91550	do	999	Yubuts, Yezo	Sept. 15, 1882	♂ ad.	99	64	1
91551	do	1000	Sapporo, Yezo	June 23, 1882	♂ ad.	104	66	1
91465	do	912	Yokohama	Jan. 3, 1883	♀ ad.	92	58	1
91466	do	913	do	Jan. 3, 1883	♀ ad.	98	65	1
91467	do	914	do	Jan. 3, 1883	♀ ad.	93	58	1
	Average measurements of three males					103	64	1
	Average measurements of three females					94	60	1

B.—ALAUDA INTERMEDIA.

86159	Jouy & Dale	222	Vladivostok	June 15, 1881	♂ ad.	106	67	1
86160	do	223	do	June 27, 1881	♂ ad.	107	69	1
	Average measurements of two males					106	68	1

C.—ALAUDA CŒLIVOX.

37788	Swinhoe		Formosa	Mar. —, 1863		91	57	
86112	Jouy & Dale	175	Hong-Kong	Oct. 9, 1881	♂ ad.	92	56	

D.—ALAUDA ARVENSIS.

18719			Europe			110	72	
23419	Lazar		Hungary, Europe	— —, 1860		104	63	
37766	Tristram		Sidon, Syria	Dec. 1, 1863	♀	108	64	

E.—ALAUDA CANTARELLA?.

37807	Tristram	723	Beersheba, Palestine	Feb. 4, 1864	♀	107	68	

The skylark is one of the first spring arrivals among the migratir birds of Kamtschatka, often making its appearance long before tl snow has melted away from the ground. In 1883 the first specim on Bering Island was shot on the 19th of April, while sitting on tl beach picking up small crustaceans, and when in the middle of May I a rived at Petropaulski the larks were plentiful on the few bare spots fr whence the males rose on quivering wing, singing their "wild, joyo

notes," fascinating the listener by the cheerfulness if not by the beauty of their music, notwithstanding the 5 to 6 feet depth of snow on the ground.

As already stated, the lark occurs also on Bering Island, where a few may be heard during the summer between the village and Ladiginsk, among the sand dunes covered with a luxuriant growth of *Elymus*.

Family CORVIDÆ.

106. Corvus behringianus (DYB.).

1926.—*Corvus corax* PALL., Zoogr. Ross. As., I, p. 380 (*part*).
1883.—*Corvus corax behringianus* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 363.
1894.—*Corvus grebnitskii* STEJNEGER, Pr. Biol. Soc. Washingt., II, p. 97.

I have not been able to detect any difference between my specimens and those from Central Europe in respect to dimensions, size, or shape of the bill, size of the nasal bristles, or luster of the plumage.

The only distinction I can see is the different wing formula, which in all specimens examined by me is constant. Going over the literature, besides, I find it unanimously stated that in the European bird the third and the fourth primaries are the longest, the third being decidedly longer than the fifth, while in all my ravens from the Commander Islands the fourth and the fifth are the longest, the latter being a trifle shorter than the former, but considerably longer than the third, the difference in the two forms consequently being very well marked. At the same time the first primary seems to be reduced in length, as it falls between the eighth and the ninth, in one instance even between the ninth and tenth, while I think the rule in the European species is that it falls between the seventh and the eighth.

These differences may have originated in the insular habitat of the present form, but whatever may have been the cause, the difference is now established; and it does not invalidate the distinctness of the form that we are able to point out its probable cause. If the suggested explanation be true, it would be a most remarkable fact, showing the effect of insular isolation even on so powerful a flyer as the raven. As we here have a case of "breeding in and in" within a small stock, it is interesting to observe that it has not had the same influence as on the Faer Islands, where it seems to have produced a race of partial albinos.

A comparison with the large series of skins of *C. corax carnivorus* from North America, especially with those from Alaska, has not been neglected, the result being that the Commander Islands birds are distin-

guished from the American race in the same manner as are the European specimens, besides differing in the wing formula, which is alike in the American and the European forms. In all the specimens examined by me the third primary was equal to or longer than the fifth, and never shorter.

Since the above was written I have learned that Dr. Dybowski has named the bird from Bering Island *Corvus corax behringianus*. As the name given by him has a priority of about two months it must stand, although being rather unfitting, as the bird is more common on Copper Island than on Bering Island. I see no reason for regarding it as only a subspecies, as no intergradation is known, or is likely to occur.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Culmen from frontal feathers.	Graduation of tail.
					mm.	mm.	mm.	mm.	mm.	mm.
92757	1736	Bering Island	Nov. 15, 1882	♂ ad.	685	.....	450	252	83	.....
92759	1799	.....do	Dec. 12, 1882.	♂ ad.	715	50	460	255	77	6
92758	1972	.....do	Apr. 11, 1883.	♂ ad.	690	35	440	250	81	6
62760	1817	.....do	Dec. 25, 1882.	♀ ad.	660	.....	426	235	75	6

No. 92757.—Iris dark brown. Bill and feet black; toes below yellowish gray.
No. 92759.—Outstretched toes almost reach tip of wings. Caught in a trap set for foxes.
No. 92758.—Testes swollen. Weight 5 pounds.
No. 92760.—Weight, 4½ pounds.

The raven ("*rorón*" of the natives) is a resident on both islands, but is not numerous on either, although they are rather common near the killing-grounds of the seal-rookeries during and after the sealing season but at that time all the ravens of the island are collected on these places. During the summer and autumn they feed almost exclusively upon the numberless carcasses of the slaughtered seals, fighting and quarreling at that time with the stone foxes and the glaucous-winged gulls. During the winter the supply of food is more scanty, and they are, during the hard season, restricted to what the ocean throws upon the beach, although of later years the introduction of *Arvicola rutilus* has added a new and welcome dish to their bill of fare.

Early in the spring they commence building their nests in a hole, or crack of some steep and inaccessible rock, the pairs being either single or in small colonies of three or four.

Being acquainted with Dybowski's statement respecting the crow-like voice of the Siberian raven, I paid special attention to the sounds uttered by our island form. I can most emphatically state that the latter has a voice which in no respect is like that of a crow (*Corvus cornix*), and the common notes "krôh" and "korr" are in fact almost identical with that of the Norwegian *C. corax*, while the bell-like, sonorous "klong, klong" is higher and a little less sounding. It has, however, another very peculiar note, which I have never heard before. It often happened on Copper Island that, when engaged in climbing high up on the steep mountain peaks, I was startled by a sonorous and distinctly articulated "haló, haló!" so like the voice of a human being that I repeatedly looked around to discover the supposed Aleut before raising my eyes to the skies, where the black scavenger amused himself by hallooing to a neighbor on the other side of the valley, who would then answer with a similar "haló!" It was only distinguishable from the human voice by its somewhat more metallic sound.

I need hardly add that the raven here, as in most places where he has been for some time in contact with man, is extremely shy and difficult to get at within shot range.

107. Corvus corone levaillantii (Less.).

1831.—*Corvus levaillantii* Less., Tr. d'Orn , p. 328.
1846.—*Corvus culminatus* Gray, Cat. Nep. Hodgs. (p. 102) (*nec* Sykes, 1831).
1858.—*Corvus corone* Kittl., Denkw., I, p. 313, and II, p. 412.—Swinh., Ibis, 1874, p. 159.—Blakist. & Pryer, Ibis, 1878, p. 232.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 212.—*Id.*, *ibid.*, X, 1882, p. 141.—Blakist., Amend. List B. Jap., p. 14 (1884).
1858.—*Corvus sinensis* Moore, Cat. B. Mus. E. Ind. Co., II, p. 556.—Swinh., Ibis, 1862, p. 260.—*Id.*, *ibid.*, 1863, pp. 95, 383.—*Id.*, *ibid.*, 1870, p. 348.—*Id.*, P. Z. S., 1863, p. 305.—*Id.*, *ibid.*, 1871, p. 383.
1861.—*Corvus japonicus* Swinh., Ibis, 1861, p. 337 (nec *japonensis* Bp.).
1862.—*Corvus japonensis* Swinh., Ibis, 1862, p. 260 (*nec* Bp.).
1864.—*Corvus colonorum* Swinh., Ibis, 1864, p. 427.—*Id.*, *ibid.*, 1866, pp. 296, 402.
1875.—*Corvus orientalis* Taczan., J. f. Orn., 1875, p. 251.—*Id.*, *ibid.*, 1876, p. 198 (*nec* Eversm.).—Dybow., Bull. Soc. Zool. France, 1883, p. 362.

The specimens of the Carrion Crow collected by me at Petropaulski agree in every respect with skins from Japan. The latter has been stated to be the same as the European *C. corone*, but a careful comparison has led me to a different conclusion. While agreeing with the European bird in size the color is quite different. In the true *corone* the gloss all over is most decidedly purplish, while in the Kamtschatkan and Japanese specimens before me the luster is equally decidedly greenish. In fact, the latter come, in this respect, nearer to the big-

[illegible] the first [illegible] [illegible] [illegible]

The Carrion Crow is as common in Petropaulski at the present day as it was formerly, according to the narratives of earlier travelers. They perform the same duties in Kamtschatka as do the vultures and turkey-buzzards, of more southern regions, and the more intelligent of the inhabitants, interested in the cleanliness of the town, object when anybody disturbs these public scavengers.

The Black Crow does not occur on the island, except as a rare straggler from the mainland. The cosak on Bering Island, Alexander Selivanoff, who, of course, was very familiar with these birds from his native place, Petropaulski, observed a single crow near the southern sea-rookery early in the spring of 1883.

108. Pica kamtschatica STEJNEGER.

1826.—*Corvus pica* PALL., Zoogr. Ross. Asiat., I, p. 389 (*part*).—KITTL., Denkw., II, p. 320 (1858).
1850.—*Pica caudata* BP., Consp. Av., I, p. 382 (*part*).
1858.—*Pica leuconotos* BREHM, J. f. Orn., 1858, p. 173 (*part*).
1876.—*Pica media* BLAKIST., Ibis, 1876, p. 333 (*nec* BLYTH).
1882.—*Pica leucoptera* STEJNEGER, Naturen, 1882, p. 182 (*nec* GOULD).—DYBOW., Bull. Zool. Soc. France, 1883, p. 362.
1884.—*Pica camtschatica* STEJNEGER, Pr. Biol. Soc. Washingt., II, p. 97.

The Kamtschatkan Magpie is the largest form with which I am acquainted, and exceeds in size even the Central Asiatic *P. leuconotos* BRM.* Unfortunately I have no Japanese specimens for comparison, but judging from Sharpe's table of dimensions, in his Cat. Birds Brit. Mus., III, p. 64, they do not seem to be larger than the average European bird, and Taczanowski (J. f. Orn. 1875, p. 251) informs us that the specimen from Ussuri (*op. cit.*, 1876, p. 198, identified as *P. japonica*) "is much smaller than Daurian and Baicalian Magpies (*P. leuconotos*)," and that "the wing and the tail are not so lustrous colored, being in that respect superseded even by the European Magpies." As the Kamtschatkan bird, besides its superior size, is one of the most brilliantly colored forms, it would seem improper to unite it with its southern neighbor.

A close comparison of adult specimens with South Chinese and Daurian specimens shows that *P. kamtschatica* differs from both *P. sericea* GOULD and *leuconotos* BRM. by having the feathers of the throat black to their very base, while the two latter forms have them distinctly white on their basal half. From the Chinese birds it is easily distinguished, (1) by having the primaries white to their very tips, while those in *P. sericea* have a rather broad, black edge; (2) by a larger and purer

*Cab. Journ. f. Orn., 1858, p. 173, = *Pica leucoptera* GOULD, 1862.

white band on the rump; (3) by a more greenish gloss on th (4) by much shorter tarsi, and, on the whole, much weaker an feet; and (5) by the absence of white on the feathers of the t

It seems to me that the Chinese bird is a rather well defin the distinguishing marks of which are very well pointed out i original description, the greater extent of the blue gloss on and the remarkable stoutness of the feet being especially char features. It has, besides, a rather long bill. These characters h even in the young birds, which differ from the young *P. kamts* having the rump uniform black, while in the latter it has a broa band.

From *leuconotos* our new bird differs in having a decidedly lo stouter bill, the white on wing and rump still more developed, feathers on the throat entirely black. With the European agrees in having the throat-feathers entirely black,* but diffe greater amount of white on wing and rump, the larger size, longer and stouter bill. In contradistinction to the young east the young ones of the European form have the uropygium d Northern and Eastern Europe (Northern Norway and Russi occurs a race which has more white on the primaries and on t than in the common central European bird, being otherwise guishable. This race should stand as *Pica pica borealis*, v Spanish race with black rump, which has already been desc Brehm from that country, is entitled to the name *Pica pica* (BRM., 1858).

Whether the different forms of Magpies mentioned intergrad what degree, I am, at present, unprepared to state. It must n gotten, however, that if we accept the theory of hybridization planation of the intergradation in similar cases, the same theo very applicable to the present group of birds. In fact, I see v difference between the case of Magpies, and *e. g.*, that of the Grey In the mean time it does not seem proper to call the present b *pica camtschatica* until the intergradation is proved.

* It is said that sometimes a European bird may be found having those fea or less white at the base. This would indicate that the common European sprung from an original stock having this feature. Such an individual, sho acters lost a long time ago by the species as a species, is liable to come up e the best differentiated species, but, of course, they do not prove any inter with another allied form, which has still preserved the original feature.

Tables of dimensions.

A.—PICA KAMTSCHATICA.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
69144*	1237	Petropaulski	June 29, 1882	♂ ad.	525	.....	217	284	34	42
92695	2727	.....do	Sept. 30, 1883	♂ ad.	525	185	218	274	35.5	45
92698	2596	.....do	Sept. 18, 1883	♀ jun.	458	155	206	229	32.8	43.5
92697	2603	.....do	Sept. 20, 1883	♂ juv.	.....	.....	214	253	36	44.5
92696	2755	.....do	Oct. 8, 1883	♀ juv.	435	128	206	217	31.7	43

*Iris dark brown. Bill and feet black.

B.—PICA SERICEA.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	*mm.*	*mm.*	*mm.*
86166	Jouy & Dale	166	Hong-Kong	Oct. 10, 1881	♀ ad.	209	236	33	48
21102	Captain Rodgers	222	....do	Mar. —, 1855	.....	199	231	33.3	46.7
85869	Jouy & Dale	43	Shanghai	Aug. 1, 1881	♀ juv.	201	212	35.6	46.5
85870	....do	44	....do	Aug. 1, 1881	.....	198	206	33.8	49.8

C.—PICA PICA.

Number of specimens.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
	mm.	*mm.*	*mm.*	*mm*
Average measurements of four male adults from Central Europe	186	226	29.3	42.7
Average measurements of four female adults from Central Europe	183	220	29.5	42.9

The Magpie is a common resident of Petropaulski.

On the 18th of May, 1883, I examined a nest built on the first branches of a *Salix*, about 9 feet above the ground, which under the tree was covered with 2 feet of snow. The structure which was not yet finished inside, consisted of dry sticks, forming a globular mass, the exterior diameter of which was about 30 inches. The nest, which was exactly like that of *P. pica*, contained no eggs at that time. The owners were shy, leaving the nest when I was still a great distance off.

They breed at least twice during the summer, and I suspect t young (No. 92695), which I shot as late as the 8th of October, an still was partly downy, belonged to a third brood.

No difference in the note from that of the European bird coul tected.

It is not known that the Magpie has ever been met with on the

Family FRINGILLIDÆ.

109. Hypocentor aureolus (PALL.).

1773.—*Emberiza aurcola* PALL., Reise Russ. Reichs., II, App. (p. 711).—*Id.*, Zoo Asiat., II, p. 52 (1826).—KITTL., Kupfert., p. 17, tf. 22, f. 1 (183 Denkwürd., II, p. 197 (1858).—MIDDEND., Sibir. Reise, II, 2 (p. 138) SCHRENCK, Reise Amurl., I, p. 277 (1860).—RADDE. Reisen Sü Sibir. (p. 157 tb. iv, fig. a–h) (1863).—SWINH., Ibis, 1863, p. 378.—I 1870, p. 354.—PRZEW., Putesch. Ussur. (no. 41) (1870).—BLAK. & Tr. As. Soc. Japan, VIII, 1880, p. 230.—*Id.*, *ibid.*, X, 1882, p. 170.—B Amend. List B. Jap., p. 17 (1884).—*Euspiza a.* SWINH., Ibis, 1860, *Id.*, *ibid.*, 1861, pp. 45, 334.—*Id.*, *ibid.*, 1875, p. 451.—*Id.*, P. Z. S., 354.—*Id.*, *ibid.*, 1871, p. 387.—DYBOW. & PARVEX, J. f. Orn., 1868, TACZAN., J. f. Orn., 1873, p. 90.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, Orn Vost. Sibir., p. 38 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 1 *ibid.*, 1882, p. 393.—BLAK. & PRYER, Ibis, 1878, p. 243.—BOLAU, J. 1880, p. 127.—*Id.*, *ibid.*, 1881, p. 59.—STEJNEGER, Naturen, 1882, *Id.*, Pr. U. S. Nat. Mus., 1883, p. 71.

This species is commonly given as *Euspiza aureola*, the name being ascribed to Bonaparte with the date 1838. In his Com 1838, Bonaparte, however, created the genus name for *Emberiza cana* GM.; but having employed for this species the name *Spiza* as 1824 (Obs. Wils., No. 85, in Journ. Phil. Acad., IV, 1, August the latter must stand, and *Euspiza* becomes only its synonym. T fusion arose from Bonaparte himself, who, in 1828 (Ann. Ne Lyc.), used the name *Spiza* for a genus having *E. amœna* for ty being renamed by Baird (B. N. A., p. 500), and called *Cyanospiza* older appellation of Vieillot, *Passerina* was considered untena cause preoccupied by Linnæus in Botany. In his Consp. Av., I, Bonaparte united *E. aureola* with *americana* in the same genus. ful comparison of the two forms will convince one, however, of th erical distinctness. *Spiza americana* has a much stouter bill, the m especially being higher and more denuded at the base; the feet ar stouter and stronger, the tail proportionally shorter, less furca with the single feathers remarkably pointed, a feature not at a cated in *aureola*. Besides, only the second and third primaries uated on the outer web, while in *Hypocentor* the fourth is also si

As *E. americana* is the type of *Euspiza*, the next name, *Hypocentor*, proposed by Professor Cabanis, must be adopted. The synonymy of this genus stands as follows:

Hypocentor CAB.

<1773.—*Emberiza* PALL., Reise Russ. Reichs., II (p. 711).
<1819.—*Passerina* VIEILL., Nouv. Dict. d'Hist. Nat., XXV, p. 1 (× *Passerina* DEGL. & GERBE, Orn. Eur., I, p. 300 (1867).
<1850.—*Euspiza* BONAP., Consp., I, p. 468 (nec 1838, quæ *Spiza*, BP., nec CAB., 1850, quæ *Granativora* BP.).
=1851.—*Hypocentor* CAB., Mus. Hein., I, p. 131.

The Gold-ammer, as this species might be termed, is only of occasional and rare occurrence on Bering Island during the migration seasons. Thus several specimens were shot during the spring of 1882. Remarkably enough, not a single one was seen during the same season of the following year, although 1883 brought such an abundance of rare stragglers.

Around Petropaulski it is one of the commonest summer birds, but seems to arrive rather late, as in 1883 it had not made its appearance on the 28th of May, and before the middle of September most of them had left their northern summer homes again. A single young bird was shot by me on the last day of the same month.*

It is especially frequent in the elder groves on the slopes behind the town, alongside with *Carpodacus* and *Calliope*, in comparison with which it is a poor songster, however, its melancholy tune strongly contrasting with the merry concert of the others.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wings.	Tail-feathers.
					mm.	*mm.*	*mm.*	*mm.*
88997	1175	Bering Island	June 9, 1882	♂ ad.	162	.....	79	59
88996	1176	.....do	June 9, 1882	♂ ad.	163	.....	77	58
88995	1177	..... do	June 9, 1882	♂ ad.	155	.....	79	62
88998	1199	.....do	June 12, 1882	♂ ad.	149	.....	77	57
92649	2299	Petropaulski	July —, 1883	ad.	.....	.....	79	60
92647	2726	.....do	Sept. 30, 1883	juv.	146	37	71	55

No. 88997.—Iris dark brown. Bill horny brown, lower mandible flesh colored. Feet pale brown.
No. 92647.—Iris dark brown. Bill dull flesh-colored, above brownish gray. Feet pale brownish gray.

* I am indebted to Messrs. Sharpe and Blakiston for the identification of this speci-
men.

110. Hypocentor rusticus (PALL.).

1776.—*Emberiza rustica* PALL., Reise Russ. Reichs. (III, App., p. 698).—*Id.*, Zoogr. Ros. Asiat., II, p. 43 (1826).—KITTL., Kupfert., p. 17, tf. 22, fig. 2 (1833).—*Id.*, Denkwürd., I, pp. 314, 330, II, p. 200 (1858).—MIDD., Sibir. Reise, II, 2 (p. 139) (1853).—SCHRENCK, Reise Amurl., I, p. 278 (1860).—BLAKIST., Ibis, 1862, p. 328.—RADDE, Reisen Süden Ost-Sibir., II, (p. 173) (1863).—SWINH., P. Z. S., 1863, p. 301.—*Id.*, *ibid.*, 1871, p. 388.—*Id.*, Ibis, 1874, p. 161.—*Id.*, *ibid.*, 1876, p. 333.—WHITELY, Ibis, 1867, p. 202.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 335.—PRZEW., Putesch. Ussur. (n. 46) (1870).—TACZAN., J. f. Orn., 1873, p. 89.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, Orn. Fauna Vost. Sibir., p. 36 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 175.—*Id.*, *ibid.*, 1882, p. 393.—BLAKIST. & PRYER, Ibis, 1878, p. 243.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 229.—*Id.*, *ibid.*, X, 1882, p. 169.—BOLAU, J. f. Orn., 1880, p. 128.—*Id.*, *ibid.*, 1881, p. 59.—BLAKIST., Amend. List B. Jap., p. 17 (1884).

A male in fine spring plumage was shot on Bering Island during my absence in Petropaulski, May 21, 1883, and was prepared by my native assistant, who also measured the total length and examined the sex. Two weeks later I shot another specimen on the large tundra behind the village of Bering Island, this one being a female.

This beautiful species is only a rare straggler on the island, and its appearance in the spring of 1883 was due to the same meteorological circumstances which at that time brought so many rare birds over to the treeless island from the dense woods of Kamtschatka.

On the peninsula I met it in the fall of the same year. Single individuals were observed in the dense elder and birch thickets round Petropaulski. The birds were then silent and very shy, and kept themselves very quiet near the ground on the lowest branches. None were seen after the 5th of October, when the last one was shot.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	
92644	2071	Bering Island	May 21, 1883	(♂) ad.	(150)	.....	78	
92645	2128	.....do	June 6, 1883	♀ ad.	148	31	74	
92648	2040	Petropaulski	Sept. 25, 1883	... ...	152	31	74	
92646	2747	.....do	Oct. 5, 1883	♂	157	41	75	

No. 92645.—Iris dark brown. Upper mandible horny blackish brown, except tomia, which, like the lower mandible, are brownish flesh-colored. Feet light and clear grayish brown. Exceedingly flat. Long

No. 92646.—Bill horny blackish brown at base, and most of lower mandible rose flesh-color. light grayish flesh-color, joints darker.

111. Hypocentor variabilis (TEMM.).

355.—*Emberiza variabilis* TEMM., Pl. Color, III, livr. 98, pl. 583, fig. 2.—TEMM. & SCHLEG., Fauna Japon. Aves (pl. 56) (1847).—BLAKIST. & PRYER, Trans. As. Soc., VIII, 1880, p. 230.—*Id. ibid.*, X, 1882, p. 171.—BLAKIST., Amend. List B. Jap., p. 17 (1884).—*Euspiza v.* SWINH., Ibis, 1875, p. 450.—BLAKIST. & PRYER, Ibis, 1878, p. 243.—TACZAN., Bull. Soc. Zool. France, 1879, p. 137.—*Id., ibid.*, 1882, p. 393.—*Id.*, J. f. Orn., 1881, p. 184.

356.—*Zonotrichia musica* KITTL., Denkw., II, p. 201.—HARTL., J. f. Orn., 1859, p. 50.

I refer this species with much doubt to *Hypocentor*, and should, in fact, prefer to see it made the type of a distinct genus. It has a large bill with a remarkably long gonys; the tomia of the upper mandible are very little inflected, the nasal grooves are nearly filled with hairy feathers, and at the base are several rather strong bristles. The wing is rather short and much more rounded, the first primary being intermediate between fourth and fifth. The hind claw is very small.

There can, in my opinion, be no doubt that this is the *Zonotrichia musica* of v. Kittlitz, described by him from Kamtschatka, as he (*l. c.*) gives a very recognizable description of the old male: "It was light bluish-ash colored, only on the lower surface gradually becoming whitish; back and wing feathers black with broad edges of the same beautiful ash color as the rest of the plumage; bill and feet yellowish flesh-colored, the former grayish above; iris dark brown."

The only bird of this species which came within my observation was an adult male, an accidental straggler from Kamtschatka, shot by me in a small ravine close by the village of Bering Island on the 11th of June, 1883.

Although terribly damaged by the shot, and thus making a very poor specimen for the collection, it suffices for the following measurements and remarks:

S. Nat. Mus. No. 92643, *L. Stejneger No.* 2158.

♂ ad. Testes very large, swollen. Total length, 168^{mm}; tail beyond wings, 38^{mm}; wing, 86^{mm}; tail-feathers, 74^{mm}.

Bill blackish brown, tomia and lower mandible flesh-colored. Feet light brownish flesh-colored; claws pale.

The plumage is similarly colored to that described by v. Kittlitz above, but the black markings on the interscapular region are rather small and nearly obsolete.

This peculiar plumage, so unlike the general style of Old World *Emberizinæ*, reminds one strongly of some of the forms inhabiting the

western shores of South America.* In fact, this bird seems really to be not so very distantly related to those groups of the same family which have been considered peculiar to the New World, and v. Kittlitz was not so very far out of the way in his generic determination as he perhaps might seem to be.

112. Plectrophenax nivalis (LINN.).

1758.—*Emberiza nivalis* LIN., Syst. Nat., 10 ed., I, p. 176.—PALL., Zoogr. Ross. Asiat., II, p. 32 (1846).—*Plectrophanes n.* MIDD., Sibir. Reise, (II, 2, p. 136) (1853).—SCHRENCK, Reise Amurl., I, p. 275 (1860).—RADDE, Reisen Süden Ost-Sibir. (p. 156) (1863).—SWINH., P. Z. S., 1863, p. 301.—*Id., ibid.*, 1871, p. 389.—*Id.*, Ibis, 1875, p. 451.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 335.—FINSCH, Abh. Nat. Ver. Bremen, III, 1872, p. 54.—TACZAN., J. f. Orn., 1873, p. 86.—*Id., ibid.*, 1874, p. 335.—*Id.*, Orn. Fauna Vost. Sibir., p. 35 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 174.—*Id., ibid.*, 1882, p. 393.—COUES in Elliot, Aff. Alaska, p. 176 (1875).—HARTING, Fauna Prybilov, p. 17 (1875).—BLAKIST. & PRYER, Ibis, 1878, p. 244.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 231.—*Id., ibid.*, X, 1882, p. 172.—ADAMS, Ibis, 1878, p. 426.—BOLAU, J. f. Orn., 1881, p. 60.—*Id., ibid.*, 1882, p. 336.—ELLIOTT, Monogr. Seal-Isl, p. 128 (1882).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 149.—NELSON, Cruise Corwin, p. 68 (1883).—BLAKIST., Amend. List B. Jap., p. 62 (1884).—*Plectrophenax n.* TURNER, Auk, 1885, p. 157.

The snow-bunting is the "*sniegirok*" (plur. *sniegirki*) of the natives, and is one of the few passerine birds which are resident on the islands during the whole year. It must at once be remarked, however, that only a few remain during the winter, feeding upon what the beach may offer, contenting themselves for the greater part with *Gammaridæ* and other small crustaceans, while the bulk emigrates at the beginning of the cold season. During the whole winter single individuals, or two together, but never even small flocks, were seen at low tide on the sandy beaches close to the water's edge, being at that time just as much a "limicoline" bird as *Actodromas couesi*, both in respect to food and the locality. During this season they were silent, and even more shy, perhaps, than usual, but from the beginning of March the males would commence practicing to find out if they had forgotten the song of the foregoing year. The snow-bunting has a pretty voice, and when I again heard its sweet cadences after the long winter on the storm-beaten

* I refer here especially to *Phrygilus unicolor* (D'ORBIGN.), the male of which, in general coloration and size, is an almost perfect counterpart of my specimen. In fact, the likeness is so great that a superficial observer might take them for the same or very nearly related species, and any one adopting color as the leading characteristic of the genera would be forced to put *E. variabilis* from Japan into the South American genus *Phrygilus*.

island I fancied it the loveliest of the songsters, carrying my dreams far away to sunnier regions by his soft and unpretentious melody. At this time he only sings when sitting on the ground, preferring some projecting rock or stone, but later, during the breeding season, he will sing when rising into the air on quivering wings like a lark; but how Boie could compare his modest and gentle warbling with the vigorous and intricate trill of the skylark is rather incomprehensible to me.

On the 28th day of March, 1883, a small troop of new arrivals were observed on Bering Island, but they did not become abundant until three weeks later. They never came in large flocks, and soon disbanded. The single pairs then disperse over the island, settling wherever there are steep cliff-walls or rugged bluffs in the interior, or along the coast, far up on the mountains and down below at the beach, but always avoiding the wet tundra or the flat, dreary, mountain plateaus of the northern part. If the season is open and otherwise favorable, the first eggs will be laid shortly after the middle of May; the young will be out in the beginning of June, and in July I have found the fresh eggs of a second brood.

The measurements of the eggs taken are as follows:

U. S. Nat. Mus. No.	Stejneger No.	Diameters.	Date.	Locality.	Remarks.
		Millimeters.			
21812	1230	24 by 17.5	June 15, 1882	Copper Island	Nest contained five eggs.*
		24.5 by 17			
21812 bis	2518	23.5 by 18.5	July 3, 1883	Bering Island	
21813	1227	24 by 18	June 4, 1882	Copper Island	Full clutch.
		24.5 by 18			
		24.25 by 18			
		24.75 by 18			
21814	1229	26 by 17.75	June 11, 1882	....do....	Do.
		26 by 17.25			
		27 by 17.5			

*Dimensions of nest: External diameter, 110mm; internal diameter, 70mm.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	mm.	mm.
88999	1033	Bering Island	May 10, 1882	♂ ad.	176	110	66
89001	1060	do	May 19, 1882	♂ ad.	190	120	78
89000	1086	do	May 24, 1882	♂ ad.	185	113	72
92650	1693	do	Oct. 23, 1882	♂	196	113	76
92651	1778	do	Dec. 13, 1882	.....	187	113	72
92652	2220	Copper Island	July 2, 1883	juv.	.....	98	62
92653	2217	do	July 1, 1883	juv.	144	83	49

No. 89001.—Iris dark brown. Bill black, corner of mouth yellow. Feet brownish black.

No. 92650.—Bill yellow, tip and culmen blackish. Feet brownish black.

No. 92653.—Iris dark brown. Bill light brownish yellow, dusky on culmen, and with a greenish tinge in front of nostrils; angle of mouth pale yellow. Feet gray, with a purplish tinge above and yellowish below.

No. 92652.—Differed from the foregoing only in having the more dusky on the upper mandible.

113. Calcarius lapponicus (Lin.).

1758.—*Fringilla lapponica* Lin., Syst. Nat., 10 ed., I, p. 180.—*Plectrophanes l.* Swains. & Rich., Faun. Bor. Am., II, p. 245, pl. xlviii (1831).—Midd., Sibir. Reise, II, 2, (p. 136) (1853).—Schrenck, Reise Amurl., I, p. 276 (1860).—Swinh., Ibis, 1861, p. 334.—*Id.*, P. Z. S., 1871, p. 389.—Radde, Reisen Süden Ost-Sibir. (p. 156) (1863).—Przew., Putesch. Ussur. (n. 40) (1870).—Finsch, Abh. Nat. Ver. Bremen, III, 1872, p. 54.—Taczan., J. f. Orn., 1873, p. 86.—*Id.*, Ibid., 1874, p. 335.—*Id.*, Ornith. Fauna Vost. Sibir., p. 35 (1877).—*Id.*, Bull. Soc. Zool. France, 1882, p. 393.—Coues in Elliott's Aff. Alaska, p. 177 (1875).—Harting, Fauna Prybil., p. 17 (1875).—Adams, Ibis, 1878, p. 425.—H. W. Elliott, Monogr. Seal Isl., p. 128 (1882).—*Centrophanes l.* Swinh., P. Z. S., 1863, p. 301.—Bean, Pr. U. S. Nat. Mus., 1882, p. 150.—Nelson, Cruise Corwin, p. 69 (1883.)—*Calcarius l.* Turner, Auk, 1885, p. 157.

1773.—*Fringilla calcarata* Pall., Reise Russ. Reichs., II, App., p. 710.—*Passer calcaratus Id.*, Zoogr. Ross. Asiat., II, p. 18, (1826.)—*Plectrophanes calcaratus* Kittl., Denkw., I, p. 337.

The "*Tschelutschjék*," as this bird is called by the natives, is one of the commonest of the land birds on the Commander Islands, and certainly the commonest on Bering Island, being pretty evenly distributed over all the lower parts of the country. Its monotonous and melancholy chirp is in many places the only sound heard besides the howling of the wind and the murmur of the distant breakers, making the fog-clad tundras still more desolate and gloomy. But the Longspur is also found among the earth-huts and the houses of the village, where he represents the house sparrow, and I have seen him on the

fields as well as on the outmost stones of the surf-washed reef, and their snug nests both in the dampest place of the large swamp n the dry, sunny bluffs of the sand-hills or on the lichen-covered s of the mountains. In the interior, and higher up in the mount- the Snow-ammer takes his place, however.

out its occurrence in Kamtschatka I can only say that I met a , exceedingly shy individual at the graveyard of Petropaulski g the first half of October.

y had already commenced their breeding business when I arrived islands, in May, 1882, and it was, in fact, the first bird of my col- n. When the autumn storms commenced, the families gathered ier in small flocks and left our inhospitable islands for milder is, and in the latter part of October only some few solitary birds seen, but these also soon disappeared. Not a single one remained native island during the winter, and not before the 21st of April e hear the well-known chirping of the few first arrivals. It was ntil after the lapse of several days that the bulk of them landed, he flocks very soon dissolved into pairs eager to begin the old story ve and parental happiness and sorrows. There were enough of ies bringing on the latter, among them the collector of the National um. The eggs taken measure as follows:

Stejneger No.	Diameters.	Date.	Locality.	Remarks.
	Millimeters.			
1197	22.5 by 17	June 11, 1882	Bering Island.....	Full clutch.
	23 by 16.25			
	22 by 17			
1183	23 by 15	June 9, 1882	.....do	Do.
	22.5 by 16			
	22 by 15.5			
1160	22 by 16	June 6, 1882	.....do	Nest contained two eggs.
2197	.....	June 6, 1883	.....do	Clutch of four eggs.
	20.5 by 15.25			
	21 by 15			
	20 by 15			
2111	22 by 17	May 23, 1883	.....do	Full clutch.
	21.75 by 16.25			
	21.75 by 17			
2112	22 by 15.5	May 30, 1883	.....do	Do.
	23 by 15			
	23 by 15.5			

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	mm.	
89167	1002	Copper Island	May 6, 1882	♂ ad.	174	98	64
89168	1003	do	May 6, 1882	♂ ad.	170	99	[illegible]
89169	1004	do	May 6, 1882	♂ ad.	167	97	[illegible]
89005	1013	Bering Island	May 9, 1882	♂ ad.	165	95	[illegible]
89004	1018	do	May 9, 1882	♂ ad.	156	97	[illegible]
89002	1011	do	May 9, 1882	♀ ad.	162	90	[illegible]
89003	1019	do	May 9, 1882	♀ ad.	159	94	[illegible]
89131	1216	Copper Island	June 21, 1882	♀ ad.	155	99	[illegible]
92655	1704	Bering Island	Oct. 31, 1882	♂ ad.	172	96	[illegible]
92654	1687	do	Oct. 16, 1882	♂ jun.	161	90	[illegible]
92656	1699	do	Oct. 26, 1882	♀ jun.	162	88	[illegible]
89015	1262	do	July 15, 1882	♂ juv.	157	87	[illegible]
89016	1264	do	July 18, 1882	♂ juv.	108	57	[illegible]

No. 89004.—Iris dark brown. Feet brownish black.

No. 89131.—Bill brownish yellow with blackish tip. Feet dark brown.

No. 92654.—Iris dark hazel. Bill reddish gray, black at tip of upper mandible. Feet dark brownish gr[illegible]

No. 92656.—Bill light brownish gray, tip blackish. Feet blackish brown.

No. 89015.—Iris dark brown. Bill brownish gray with a yellow spot along the middle of up[illegible] tomium. Feet reddish pearl gray.

No. 89016.—Bill dark gray, tomium of upper mandible, angle of mouth, and tip of mandibles whit[illegible] Feet brownish flesh-color, tarsus behind and toes below yellowish.

The specimens from the Commander Islands are very bright-colore[illegible] the chestnut, black, and white being of greater purity than is perha[illegible] usual. This is, however, the only difference which can be detected a large series, and individuals just as bright are not unfrequent fr[illegible] other localities.

114. Acanthis* linaria (LIN.).

1758.—*Fringilla linaria* LIN., Syst. Nat., 10 ed., I, p. 182.—KITTL., Denkw., I, 321 (1858).—*Passer l.* PALL., Zoogr. Ross. As., II, p. 25 (1826).—*Ægiothus* [illegible] SWINH., P. Z. L., 1863, p. 299.—*Acanthis l.* DYBOW. & PARVEX, J [illegible] Orn., 1868, p. 335.—TACZAN., J. f. Orn., 1873, p. 92.—*Id., ibid.*, 1874, [illegible] 335.—*Id., Ibid.*, 1876, p. 200.—*Id.*, Bull. Soc. Zool. France, 1876, p. 18[illegible] *Id., Ibid.*, 1882, p. 394.—*Id.*, Orn. Fauna Vost. Sibir., p. 39 (1877).—[illegible] BOWSKI, Bull. Soc. Zool. France, 1883, p. 365.—*Ægiothus l.* BLAKIST.— PRYER, Ibis, 1878, p. 245.—BOLAU, J. f. Orn., 1880, p. 127.—*Id., ibid.*, 1 [illegible] p. 335.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 149.—NELSON, Cruise Corwi[illegible], 68 (1883).—RIDGW., Pr. U. S. Nat. Mus., 1883, p. 371.

1880.—*Linota rufescens* (?) BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 188[illegible], 233 (*nec* VIEILL.).—*Id., ibid.*, X, 1882, p. 174.

1883.—*Acanthis innominatus* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 366.

This form seems to be the common breeding bird on the mainlan[illegible] Kamtschatka, where I got a very young specimen near Petropaulski [illegible] the 4th of July, 1882.

*About the generic term see "Notes on the genus Acanthis," in "The Auk," 1884, p. 145.

I do not think that it breeds on the islands, however, as it was not met with from the end of May until the beginning of November. Between the 21st and the 28th of May, 1882, I met a few small troops, consisting of three to five individuals, but their behavior convinced me that they were not thinking of breeding; they were probably on their way westward. During the winter, from November till March, this race was the most common of the three forms occurring on the island, although never met with in flocks of more than six individuals. They were always moving rapidly and distinguished themselves by a remarkable shyness.

Having discussed the affinities of the birds in question further on under the heading of *A. exilipes*, as also in a previous paper (Auk, 1884, p. 148), I content myself here by only giving some comparative measurements of birds from different parts of the circumpolar realm. Among these are several specimens marked *L. ordinaria*, *parvirostris*, or *betularum* in Sundevall's own handwriting. It will be seen that only such specimens have been selected for measurement, the locality, date, and sex of which were stated by the collector. Five specimens collected by myself, the sex of which I was unable to determine, are kept separate in the list of specimens collected. It is too often the fault of authors pretending to give the results of "careful comparisons" that they mix birds of different sex and age, and from different seasons, together, without stating the known particulars pertaining to every single specimen, thus depriving the public of the means by which an intelligent judgment respecting the value of the conclusion arrived at, can be formed.

List of specimens collected (sex determined).

a.—SUMMER SPECIMENS.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*
89006	1065	Bering Island	May 21, 1882	♂ ad.	126	7.5	73	59	11
89012	1111	do	May 28, 1882	♂	127	7	72	.....	.....
		Average			126.5	7.2	72.5	.....	.....
89013	1066	Bering Island	May 21, 1882	♀	122	8	70	55	9
89010	1067	do	May 21, 1882	♀	124	7	75	58	10
89011	1082	do	May 25, 1882	♀	122	7	70	55	11
89014	1112	do	May 28, 1882	♀	.....	7	68	55	.....
		Average			122.7	7.2	70.7	55.7	10

List of specimens collected—Continued.

A.—WINTER SPECIMENS.

[illegible]	[illegible]	Locality.	When collected.	Sex and age.	Total length.	Bill from nostrils.	Wing.	Tail-feathers.	Formation of tail.
					mm.	mm.	mm.	mm.	mm.
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♂ ad.	133	7	75	58	11
[illegible]	[illegible]	[illegible]	Jan. [illegible], 1883	♂ ad.	128	7	75	61	10
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♂ ad.	122	7.5	70	54	10
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♂ ad.	131	7.5	73	58	10
[illegible]	[illegible]	[illegible]	Jan. [illegible], 1883	♂	.....	7	73	56	11
[illegible]	[illegible]	[illegible]	Feb. [illegible], 1883	♂	133	7	74	61	13
[illegible]	[illegible]	[illegible]	Feb. [illegible], 1883	♂	132	7.5	74	61	11
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♂	129	8	71	54	9
		[illegible]			130	7.5	73	58	11
[illegible]	[illegible]	[illegible]	Nov. [illegible], 1882	♀	130	7.5	71	57	11
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♀	129	7.5	71	55	11
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♀	129	7	71	56	13
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♀	125	7	70	56	9
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♀	126	7	71	55	9
[illegible]	[illegible]	[illegible]	Dec. [illegible], 1882	♀	132	7	72	58	11
[illegible]	[illegible]	[illegible]	Jan. [illegible], 1883	♀	126	6.5	70	55	10
[illegible]	[illegible]	[illegible]	Feb. [illegible], 1883	♀	128	8	71	55	8
[illegible]	[illegible]	[illegible]	Feb. [illegible], 1883	♀	126	7	69	55	.....
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♀	126	7	71	55	10
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♀	128	7.5	74	58	9
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♀	126	7	72	57	.....
[illegible]	[illegible]	[illegible]	Mar. [illegible], 1883	♀	122	7	70	53	9
		[illegible]			125.9	7.2	71	55.8	10

Tables of dimensions.

1.—PALÆARCTIC SPECIMENS (*BETULARUM*).

A.—WINTER SPECIMENS.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
						mm.	*mm.*	*mm.*	*mm.*
32436	Sundevall	11	Stockholm	Mar. 22, 1864	♂ ad.	7	75	57	9
32437	do	10	do	Jan. 22, 1859	♂	8	74	57	12
34135	do	9	do	Oct. —, 1853	♂	8	73	57	11
			Average			7.7	74	57	10.7
34139	do	2	do	Dec. —, 1841	♀	7	69	57	12
34142	do	7	do	Mar. 24, 1863	♀	7.5	73	56	8
			Average			7.2	71	56.5	10

B.—SUMMER SPECIMEN.

34138	Sundevall		Sweden, 62° latitude	June 3, 1857	♂ ad.	7.5	75	55	10

2.—NEARCTIC SPECIMENS.

A.—WINTER SPECIMENS.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
						mm	*mm.*	*mm.*	*mm.*
39364	B. R. Ross	823	Fort Simpson	Apr. 26, 1860	♂ ad.	7.5	77	59	10
60970	Schmidt	1129	Green River, Wyo	Oct. 10, 1870	♂ ad.	...	72	55	11
83404	Merrill	430	Fort Shaw	Jan. 3, 1880	♂ ad.	7.5	75	59	9
86263	Rosevelt	441	Garrison, N. Y	Jan. 16, 1875	♂ ad.	8	74	58	9
88050	Shufeldt	287	Fort Laramie, Wyo	Nov. 6, 1878	♂ ad.	8	75	59	9
			Average			7.8	74.8	58	9.6
73303	Turner	1490	Fort Yukon, Alaska	Apr. 15, 1877	♀ ad.	7.5	68	56	11
68645	Bean		Fort Runyon, Va	Feb. 19, 1875	♀ ad.	8	74	60	.....
83397	Boardman		New Brunswick	Jan. —, 1879	♀ ad.	8	76	62	12
88399	Nelson	1036	Rhode Island	Mar. —, 1875	♀ ad.	7	68	58	12
			Average			7.6	71.5	59	11.7

2.—NEARCTIC SPECIMENS—Continued.

B.—SUMMER SPECIMENS (*fuscescens* COUES).

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Forcation of tail.
						mm.	mm.	mm.	mm.
18002*	Coues.....	.....	Groswater Bay, Labrador	July 23, 1860	♂ ad.	7.5	73	58	10
18098*	.. do.....	.....	.....do.....	July 24, 1860	♂ ad.	7.5	72	56	9
18100	....do.....	1454	.....do.....	July 17, 1860	♂ ad.	7	72	55	9
51914	McFarlane ...	3479	Rendezvous Lake, Arct. Am..	June —, 1865	♂ ad.	7.5	73	.....	.....
58428	Bischoff	.....	Fort Kenay, Alaska.....	May 28, 1869	♂ ad.	7.5	70	56	9
73304	Turner	1615	Fort Yukon, Alaska	May 3, 1877	♂ ad.	8	73	57	8
86526	McKay	4	Nushagak, Alaska	June 21, 1881	♂ ad.	7.5	70	55	10
			Average	.....	.....	7.5	71.9	56.2	9.2
	Kennicott	685	Fort Resolution, Arct. Am....	June 13 ——	♀ ad.	7.5	69	53	8
18097†	Coues	.....	Groswater Bay, Labrador.	July 17, 1860	♀ ad.	6	67	54	10
27446	Lockhart	195	Fort Yukon, Alaska	June 30 ——	♀ ad.	7.5	70	58	8
43318	McFarlane ...	1600	Fort Anderson, Arct. Am.....	June 8, 1864	♀ ad.	7.5	69	55	10
81367	Bean.....	3339	Chugachik Bay, Alaska.....	July 1, 1880	♀ ad.	7	71	58	11
			Average	.....	.....	7.1	69.2	55.6	9.4

* Type! † Bill very worn.

115. Acanthis linaria holboellii (BREHM).

1826.—*Passer linaria* PALL., Zoogr. Ross. As., II, p. 25 (*part*).

1831.—*Linaria holboellii* BREHM, Handb. Vög. Deutschl., p. 280.—*Acanthis h.* TACZAN., J. f. Orn., 1874, p. 324.—*Id.*, Bull. Soc. Zool. France, 1876, p. 180.—*Id.*, Orn. Faun. Vost. Sibir., p. 40 (1877).—DYBOW., Bull. Soc. Zool. France, 1883, p. 365.

1883.—*Acanthis intermedius* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 365.

The long and slender-billed Red Poll is a resident of Bering Island, and is probably the only form which remains there during the summer. It may be, however, that it leaves the island late in winter, as I did not get a single specimen between the 2d of January and the middle of April, although every Red Poll which came within shot range was brought down for identification.

A careful comparison with American specimens (cf. my memoir The Auk, 1884, p. 148) and with typical specimens of Sundevall's *magnirostris* shows no tangible difference. They are rather typical both in size and color, and represent the distinctive characters from the *linaria* vera pretty well.

Below I give, besides a list of the specimens obtained by me and their dimensions, a table of measurements taken from Scandinavian specimens, three of which are marked "*magnirostris*" in Sundevall's own handwriting.

List of specimens obtained.

A.—SUMMER SPECIMENS.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wing.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
					mm.	mm.	mm.	mm.	mm.	mm.
89008	1090	Bering Island	May 28, 1882	♂	134	.....	9	70	55	11
92609	2168	..... do	June 13, 1883	♂	137	25	9	75	58	12
89007	1076	.....do	May 23, 1882	♀	136	.....	9	72	61	14

B.—WINTER SPECIMENS.

92592	1701	Bering Island	Oct. 27, 1882	♂ ad.	139	.....	9	74	57	10
92597	1702	.....do	Oct. 28, 1882	♂ ad.	135	.....	8.5	75	60	10
92596	1728	.....do	Nov. 13, 1882	♂ ad.	132	.....	8.5	75	58	11
92600	1794	.....do	Dec. 13, 1882	♂ ad.	136	.....	9	78	60	11
92599	1845	.....do	Jan. 2, 1883	♂	133	.....	9	76	60	12
92601	1846	.....do	Jan. 2, 1883	♂	132	.....	8	76	59	12
92603	1792	..... do	Dec. 13, 1882	♂ ad.	137	.....	9	74	58	11
92625	1777	.....do	Dec. 4, 1882	♀	133	.....	9	73	57	11

No. 92609.—Iris dark brown. Bill horny brownish black; tomia and base of lower mandible below yellowish gray; angle of mouth yellow. Feet blackish brown.

No. 92592.—Bill orange yellow; culmen and anterior half of gonys horny brown.

Table of dimensions of Scandinavian specimens.

A.—WINTER SPECIMENS.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
						mm.	mm.	mm.	mm.
34141	Sundevall.....	11	Stockholm.....	Mar. 20, 1863	♂ ad.	9	77	58	8
34133	....do	7	.....do	Oct. 30, 1853	♀	9	71	56	12
34134	....do	8	.....do	Oct. 14, 1855	♀	9	72	57	11

B.—SUMMER SPECIMENS.

	Stejneger	116	Western Norway.....	July 30, 1873	♂ ad.	8	75	55	7
	....do.....	171	.....do.....	July 21, 1875	♂ ad.	8	75	56	10

116. Acanthis hornemannii exilipes (COUES).

1860.—*Fringilla* (*Acanthis*) *linaria* var. *canescens* SCHRENCK, Reise Amurl., I, p. 296.
1861.—*Cannabina canescens* SWINH., Ibis, 1861, p. 335 (*nec* GOULD).—*Ægiothus c. Id.*, P. Z. S., 1863, p. 299.—*Acanthis c.* DYBOW. & PARVEX, J. f. Orn., 1868, p. 335.—TACZAN., J. f. Orn., 1873, p. 92.—*Id.*, *ibid.*, 1874, p. 336—*Id.*, Bull. Soc. Zool. France, 1876, p. 180.—*Id.*, Orn. Fauna Vost. Sibir., p. 40 (1877).—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 366.
1861.—*Ægiothus exilipes* COUES, Pr. Phil. Acad., 1861 (p. 385).
1872.—*Ægiothus linaria* var. *exilipes* COUES, Key, p. 131 (1872).
1874.—*Ægiothus canescens exilipes* RIDGW., Ann. Lyc. Nat. Hist. New York, X, 1874, p. 372.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 149.—NELSON, Cruise Corwin, p. 67 (1883).
1871.—*Ægiothus borealis* SWINH., P. Z. S., 1871, p. 386 (*nec* VIEILL.).—*Id.*, Ibis, 1874, p. 160.
1880.—*Linota linaria* BLAKIST. & PRYER, Trans. As. Soc., VIII, 1880, p. 233.—*Id.*, *ibid.*, X, 1882, p. 174.

The smaller white-rumped Red Poll is only a winter visitor to Bering Island from more northern regions. They were found in very limited numbers from November to March, flitting hastily from one dry stem of *Archangelica*, on the seeds of which they mostly feed, to another.

Though connected with the large Greenland form *hornemanii* HOLB. (*canescens* auct. *nec* GOULD), which it very closely resembles in coloration by intermediate forms, it is sufficiently distinct to be designated by a separate name. *A. hornemanii* proper is restricted as a breeding bird to Greenland, from whence it in winter visits the most northern parts of Eastern America. It is by far a larger bird, as the following comparison shows: The wings of the five males from Bering Island average (cfr. the table below) 72^{mm}, the tails 57.6^{mm}, and the bills 6.4^{mm}, while the

in winter as far south as North China and Japan, and is usually quoted by authors treating of the birds of these regions as *A. canescens*.

Its chief habitat seems, however, to be the Arctic portions of North America, where it has been found in abundance from Alaska to the Atlantic coast. By some authors it has been suggested that, the true *exilipes* also occurs through the whole of Siberia and Northern Russia to Finmarken, in Northern Norway, but, as far as I can judge, it has been confounded with a pale northern form of *linaria*, the *A. linaria pallescens* (HOMEY.). (Cf. a paper of mine in "The Auk," 1884, p. 147, "Notes on the genus Acanthis.") In fact, it is almost easier to confound *exilipes* with the non-conspecific *linaria* than with the Greenland form with which it is here considered to rank only as a subspecies; but this statement only relates to the young and immature specimens, and perhaps a few hybrids from places where both species breed in the vicinity of each other, but never to the adults which are easily distinguished by the color of the rump, this being, in *exilipes*, unstriped, pure white, or suffused with a delicate rosy tinge. The size of both species is essentially the same, except that *exilipes* has a much shorter and differently shaped bill, so that pure-bred young may easily be distinguished by a somewhat careful observer. I have, for the preparation of these remarks and of the memoir in "The Auk," quoted above, handled about two hundred and twenty specimens of both forms (not including *kolboellii* and *rostrata*), and among the whole lot there was hardly more than one specimen the identification of which gave any *serious* trouble, that being an adult male with red breast, and showing intermediate features suggesting its probable hybrid origin. For more particulars I refer to the tables of dimensions under the next foregoing species.

I can detect no difference in the intensity of the red color of the breast in Asiatic and in American specimens, as I have specimens from both regions, which are colored rather richly, while others show only the faintest possible trace. In fact, I can match all my Bering Island skins with their counterparts from the other side of the Pacific Ocean.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation of tail.
					mm.	mm.	mm.	mm.	mm.
92621	1751	Bering Island	Nov. 27, 1882	♂ ad.	128	6.5	71	55	9
92619	1942	....do	Mar. 8, 1883	♂ ad.	123	7	71	57	10
92620	1917	... ..do	Feb. 24, 1883	♂	122	6	73	59	12
92624	1961	.....do	Mar. 22, 1883	♂	132	6.5	71	55	10
92614	1935	.....do	Mar. 4, 1883	♂	129	6	74	62	13
		Average of five males			127	6.4	72	57.6	10.8
9262	1962	Bering Island	Mar. 22, 1883	♀	122	7	69	55	11
92617	1911	.....do	Feb. 18, 1883	♀	126	6.5	71	55	12
		Average of two females			124	6.8	70	55	11.5

No. 92621.—Iris dark brown. Bill orange-yellow, culmen and tip of gonys blackish. Feet blackish brown.

No. 92619.—Extremely fat. Testes swollen. Bill yellow, culmen and gonys horny brownish gray.

No. 92624.—Bill yellow, culmen and anterior half of gonys horny brown.

No. 92617.—Bill pale orange-yellow, culmen, tomia, and gonys dark brownish.

Table of dimensions of specimens of A. exilipes from America.

A.—TYPICAL SPECIMENS FROM THE MACKENZIE RIVER.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation.
[redacted]									

Table of dimensions of specimens of A. exilipes from America—Continued.

C.—SUMMER BIRDS FROM ALASKA.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Bill from nostrils.	Wing.	Tail-feathers.	Furcation.
						mm.	*mm.*	*mm.*	*mm.*
62218	Turner	55	Saint Michael's	July 7, 1874	♂ ad.	7	73	59	10
70847	do		do	June 1, 1876	♂ ad.	7	75	60	10
81362	Dean	3752	Chamisso Island	Aug. 31, 1880	♂ ad.	7	72	58	8
82225	McKay		Nushagak	June 7, 1881	♂ ad.	6.5	72	59	8
89747	Murdoch	402	Point Barrow	June 16, 1882	♂ ad.	7	71	56	11
89745	do	486	do	July 3, 1882	♂ ad.	7	71	58	10
			Average			6.9	72.3	58.3	10
70848	Turner		Fort Yukon	May 9, 1876	♀ ad.	7	70	58	11
89746	Murdoch	390	Point Barrow	June 13, 1882	♀ ad.	7	73	55	9
			Average			7	71.5	56.5	10

117. Leucosticte griseonucha (BRANDT).

1826.—*Passer arctous* var. *γ* PALL., Zoogr. Ross. As., I, p. 23.

1841.—*Fringilla (Linaria) griseonucha* BRANDT, Bull. Acad. St. Petersb., X, 1841, No. 16, p. 19.—KITTL., Denkw., I, p. 278 (1858).

18—.—† *Montifringilla pustulata* CAB. in Ersch. & Grub. Enc., L. (p. 215).—*Fringilla p.* KITTL., Denkw., I, p. 278 (1858).

1850.—*Montifringilla griseinucha* BP. & SCHLEG., Mon. Lox., p. 35, pl. 41.—FINSCH, Abh. Nat. Bremen, III, 1872, p. 57.—*Leucosticte g.* BP., Consp. Av., I, p. 537 (1850).—CAB., Mus. Hein., I, p. 154 (1851).—BAIRD. B. N. Amer., p. 430.—*Id.*, Trans. Chic. Ac. Sc., I, 1869 (p. 317, pl. xxviii, f. 2).—*Id.*, in Coop. Birds Calif., I, p. 161 (1871).—DALL & BANN., Trans. Chic. Ac. Sc., I, 1869 (p. 282).—DALL, Avif. Al. I. eastw., p. 3, (1873).—*Id.*, Avif. Al. I. west, p. 4 (1874).—RIDGW., Bull. Geol. and Geogr. Surv. Terr., 1875, p. 77.—*Id.*, Nomencl. N. A. B., p. 21 (1881).—BEAN, Pr. U. S. Nat. Mus., 1882, p. 148.—TACZAN., Bull. Soc. Zool. France, 1882, p. 393.—NELSON, Cruise Corwin, p. 67 (1883).—DYBOW., Bull. Soc. Zool. France, 1883, p. 364.—STEJNEGER, Auk, 1884, p. 82.—*Id.*, Naturen, 1884, p. 34.—TURNER, Auk, 1885, p. 157.

1872.—† *Montifringilla speciosa* FINSCH, Abh. Nat. Ver. Bremen, III, 1872, p. 60.

1872.—*Leucosticte tephrocotis* var. *griseinucha* COUES, Key, p. 130.—*Id.*, Birds N. West, p. 111 (1874).—*Id.* in Elliott's Aff. Alaska, p. 174 (1875).—B. B. & RIDGW., Hist. N. Am. B., I, p. 508 (1874).—H. W. ELLIOTT, Monogr. Seal Isl., p. 127 (1882).

1875.—*Leucosticte tephrocotis* HARTING, Fauna Prybilov, p. 16 (1875).

1843.—*Leucosticte griseogenys* GOULD, P. Z. S., 1843, p. 104.

1883.—*Leucosticte brunneinucha* STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71 (*nec* BRANDT, (cf. "The Auk," 1884, p. 82)).

Compared with skins from the other Aleutian Islands and from the Prybiloff Islands, my specimens show very little difference. There seems to be a tendency to a darker shade of the brownish and a clearer

tint of the gray colors, especially noticeable in the winter specimen, but some summer birds are easily matched by those from the Prybiloff Islands. The bill is, in my birds, just a little larger than usual in the other ones, but the difference is too trifling to be taken into account. I have not mentioned that the birds from the Commander Islands apparently have the rosy color of the rump extending less far on the back, as this difference possibly may originate from a different make of the skins.

This is one of the few true American forms of birds occurring on the Commander Islands, being in Kamtschatka replaced by the entirely different *Leucosticte brunneonucha* (BRANDT), a species I never met with on the island, and which I do not believe occurs there.*

On Bering Island it cannot be said to be numerous, except, perhaps, in a few places where the localities are very favorable, for instance, at a rugged rock, called Kasarma, a little south of Poludjonnaja Seal-rookery. Other places where they have been met with are Kitovaja Nepropusk, about 6 miles northwest of the village, at the steep cliffs near the fishing place Saranna, at Tolstoj Mys, on the southeastern end of the island, and a few similar localities. During winter they were seldom seen, although I do not believe that they had left the island.

Copper Island, being one mass of rugged and cracked rocks and cliffs, with steep, often quite perpendicular, walls jutting up straight out of the ocean, is the favorite haunt of these stone-loving birds, which may be said to be fairly common on that island, occurring in pairs around the whole isle during the breeding season.

In the latter half of June I found the parents feeding their young, and on the 7th of July I shot three full-fledged young at one shot, while they were sitting high up on a rocky shelf, almost invisible on account of their resemblance in color to the stones, crying piteously for food. The nature of the latter may be seen from the contents of the gullets, as stated below under remarks, annexed to the list of specimens obtained. The females had very large "breeding patches," No. 92637 having almost the whole abdomen and breast destitute of feathers.

The "Aleutian Rosy Finch" delights especially in steep and high rocks,

* In my preliminary report of 1882 (Pr. U. S. Nat. Mus., 1883, p. 71), the bird of the islands was erroneously given as *L. brunneonucha*, caused by an oral communication from Dr. Dybowski, that the latter species was the common form, he having in four years only once obtained a single specimen of *grisconucha*, which was a bird mounted for aparlor decoration, in the possession of the company's agent, on Bering Island. Not having my specimens at hand when writing my report, I referred them as above, wrongly enumerating the species of *Leucosticte* as an Old World form.

especially close to the sea and inaccessible to any other beings than those provided with wings. In fact, I do not think that a single pair breeds in the interior of the islands, but after the young are out, the whole family will often move inland, following the rivulets up to the backbone of the mountains in the search for insects. Thus I met a small troop on the 10th of July, 1883, on Copper Island, pretty near midway between the two shores. The call-note of the young birds was deeper and lower than that of the adults, being almost thrush-like.

Many pairs, perhaps most of them, produce two broods in the year, and in the beginning of July, when they had finished the first one, I found several pairs in hot pursuit of their love affairs.

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*	*mm.*
92634	1858	Bering Island	Jan. 8, 1883	♂ ad.	205	40	122	85
89129	1226	Copper Island	June 23, 1882	♂ ad.	204	.....	123	85
92635	2096	Bering Island	May 21, 1883	(♂) ad.	(197)	.....	120	84
92641	2207	Copper Island	June 29, 1883	♂ ad.	214	38	122	88
92640	2228	..... do	July 5, 1883	♂ ad.	213	30	123	88
92637	2205	..... do	June 28, 1883	♀ ad.	196	35	111	77
92639	2208	..... do	June 29, 1883	♀ ad.	210	34	119	84
92638	2212	..... do	June 30, 1883	♀ ad.	200	34	114	79
89130	1473	..... do	Ju'y —, 1882	ad.	.....	.....	124	83
92636	2517	..... do	July 11, 1883	ad.	.....	.....	112	80
92642	2232	..... do	July 7, 1883	juv.	209	31	116	85

No. 92634.—Iris dark hazel. Bill orange-yellow, tip of both mandibles blackish. Feet black, both above and below. Stomach filled with coarse sand mixed with a few seeds. Tip of wings reaches tip of outer toe of the legs stretched backwards.

No. 89129.—Iris hazel. Bill brownish black. Feet black, under side of toes with a yellowish tinge. In the stomach small black seeds.

No. 92641.—Bill black; a small faint yellowish spot at base of the tomia of the upper mandible, and another near the base of the gonys.

No. 92637.—Bill horny blackish brown, lower mandible lighter, especially at base tinged with yellowish; angle of mouth and adjoining parts of mandibles pale yellow. Feet black. On abdomen and breast a large, naked patch. Gullet crammed with an enormous mass of food, consisting of (1) several dozens of a Coleopterous insect, and (2) a similar number of larvæ, &c., (3) besides leaves and buds of *Cochlearia*, and (4) some seeds.

No. 92638.—Bill at base of culmen, tomia, and gonys yellowish, the remaining parts olive blackish brown. Gullet filled with leaves of some Ericaceous plant; no trace of insects.

No. 92642.—Iris dark hazel. Bill ochraceous yellow, dusky towards the tip; angle of mouth lighter and brighter yellow. Feet very dark grayish brown.

118. Fringilla montifringilla LIN.

1758.—*Fringilla montifringilla* LIN., Syst. Nat., 10 ed., I, p. 179.—TEMM. & SCHLEG., Fauna Japon. Aves (p. 87) (1847).—MIDD., Sibir. Reise, II, 2 (p. 153) (1853).—KITTL., Denkw., I, p. 321 (1858).—SCHRENCK, Reis. Amurl., I, p. 299 (1860).—SWINH., Ibis, 1861, p. 335.—*Id.*, *ibid.*, 1864, p. 423.—*Id.*, *ibid.*, 1874, p. 160.—*Id.*, P. Z. S., 1862, p. 318.—*Id.*, *ibid.*, 1863, p. 298.—*Id.*, *ibid.*, 1871, p. 385.—RADDE, Reisen Süden Ost-Sibir., II (p. 192) (1863).—WHITELY, Ibis, 1867, p. 201.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 335.—PRZEW., Putesch. Ussuri (n. 62) (1870).—FINSCH, Verh. Zool. Bot. Ges. Wien, 1872, p. 261.—TACZAN., J. f. Orn., 1873, p. 91.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, *ibid.*, 1876, p. 199.—*Id.*, Orn. Fauna Vost. Sibir., p. 39 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 179.—*Id.*, *ibid.*, 1879, p. 138.—*Id.*, *ibid.*, 1882, p. 393.—BLAKIST. & PRYER, Ibis, 1878, p. 244.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 281.—*Id.*, *ibid.*, X, 1882, p. 172.—BOLAU, J. f. Orn., 1880, p. 125.—*Id.*, *ibid.*, 1882, p. 334.—STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 364.—BLAKIST., Amend. List B. Jap., p. 17 (1884).—*Passer m.* PALL., Zoogr. Ross. Asiat., II, p. 18 (1826).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	mm.	mm.
89018	1043	Bering Island	May 11, 1882	♂ ad.	156	92	67
92631	1666	....do	Nov. 24, 1882	♂ ad.	162	87	68
92628	2106	....do	May 22, 1883	♂ ad.	(156)	89	68
92630	2107	....do	May 25, 1883	♂ ad.	(162)	90	68
92627	2108	....do	May 25, 1883	♂ ad.	(163)	91	65
92632	2109	....do	May 25, 1883	♀ ad.	(153)	84	59
92629	2110	....do	May 25, 1883.	♀ ad.	(149)	85	59

No. 92631.—Iris hazel. Bill orange yellow, bluish black at the tip. Feet clear brown.

The Brambling is a regular visitor to Bering Island during the migration in spring and fall, but is never numerous. The few individuals observed mostly kept company with the Longspurs. During the spring of 1883 they were more common and remained longer than usual, on account of the snow covering Kamtschatka, three being shot on the 1st of June.

In size they agree completely with specimens from Western Europe, being perhaps a trifle brighter in color.

119. Chloris kawarahiba (TEMM.).

[illegible].—*Coccothraustes chloris* PALL., Zoogr. Ross. As., II, p. 13 (*part*).

[illegible].—*Fringilla kawarahiba* TEMM., Pl. Col., III, livr. 99, pl. 588, fig. 1.—TEMM. & SCHLEG., Fauna Japon. Aves (p. 89, pl. 49) (1847).—*Chlorospiza k.* WHITELY, Ibis, 1867, p. 202.—SWINH., Ibis, 1874, p. 160.—BLAKIST. & PRYER, Ibis, 1875, p. 244.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 232.—*Id.*, *ibid.*, X, 1882, p. 173.—TACZAN., J. f. Orn., 1881, p. 185.—*Id.*, Bull. Soc. Zool. France, 1882, p. 394.—DYBOW., Bull. Soc. Zool. France, 1883, p. 366.—BLAKIST., Amend. List B. Jap., p. 62 (1884).

[illegible].—*Chlorospiza kawariba* BP., Consp. Av., I, p. 514.—*Ligurinus k.* CAB., Mus. Hein., I, p. 158 (1851).—*Fringilla k.* KITTL., Denkw., II, p. 196 (1858).—*Carduelis k.* HOMEYER, J. f. Orn., 1879, p. 174.

The Japanese Greenfinch may occasionally be found on Bering [illegible]land as an accidental straggler. A fine male was caught on board [illegible]e steamer while at sea, between Kamtschatka and the island men[illegible]ned, on the 13th of June, 1882.

Another specimen, in a very faded and worn plumage, shot in the be[illegible]ning of July, 1883, was sent me from Petropaulski, where it is said [illegible] to be uncommon, although I never met it there.

List of specimens collected.

[illegible]	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*
[illegible]	1202	At sea between Bering Island and Kamtschatka.	June 13, 1882	♂ ad.	151	88	56
[illegible]	2302	Petropaulski.....	July —, 1883	ad.	.....	88	55

[illegible]89017.—Iris dark brown. Bill flesh-colored with the tip faintly tinged with blue. Feet brownish [illegible]color.

120. Carpodacus erythrinus grebnitskii subsp. nov.

[illegible].—*Loxia erythrina* PALL., Nov. Comm. Petrop., XIV (p. 587, tb. 23, fig. 1) (*part*).—*Pyrrhula e. Id.*, Zoogr. Ross. Asiat., II, p. 8 (1826).—KITTL., Denkw., II, p. 197 (1858) (*cf.* BOLLE, J. f. Orn., 1859, p. 47).—MIDD., Sibir. Reise, II, 2 (p. 150) (1853).—SCHRENCK, Reise Amurl., I, p. 294 (1860).—RADDE, Reisen Süden Ost-Sibir., II (p. 185).—PRZEW., Putesch. Ussur. (n. 55) (1870).—*Fringilla e.* KITTL., Kupfertaf., p. 23, tb. 32, fig. 1 (1833).—*Carpodacus e.* BP., & SCHLEG., Mon. Lox., p. 12 (1850).—SWINH., P. Z. S., 1862, p. 318.—*Id.*, *ibid.*, 1863, p. 299.—*Id.*, *ibid.*, 1871, p. 387.—*Id.*, Ibis, 1863, p. 95.—TACZAN., J. f. Orn., 1873, p. 93.—*Id.*, *ibid.*, 1874, p. 336.—*Id.*, *ibid.*, 1881, p. 185.—*Id.*, Bull. Soc. Zool. France, 1876, p. 181.—*Id.*, *ibid.*, 1879, p. 138.—*Id.*, *ibid.*, 1882, p. 394.—*Id.*, Orn. Fauna Vost. Sibir., p. 41 (1877).—DAVID & OUST., Ois. Chine (p. 350) (1877).—STEJNEGER, Naturen, 1882, p. 181.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 366.

[illegible]—*Carpodacus erythreus* DYB. & PARVEX, J. f. Orn., 1868, p. 335.

I have been obliged to separate this bird as a subspecies, it being dis tinguishable chiefly by the much brighter red which suffuses the plum age of the red males all over. In brightly colored specimens, for in stance the type, the whole upper surface is of a rather bright pome granate red, being only slightly duller in the scapular region, while th wings and the whole under surface are more or less suffused with ros color, throat and breast being intensely rose red.

The type is U. S. Nat. Mus. No. 89162.

In regard to the above synonymy it must be remarked, that I regar most of the Siberian references as only doubtfully relating to this form Comparison of material in European collections may decide which re erences should be eliminated.

There can be no doubt that males of this species breed in the gra plumage. I found these breeding gray males almost as common in Pe tropaulski as the red ones, their conduct and song being exactly th same as that of the latter, and dissection showed that the genital organ were well developed and fully mature. It seems to be a questio whether these mature gray birds will ever assume the red plumag and I should be most inclined to believe that we have here to do wi a kind of dichromatism. The two males here alluded to are ver gray and pale, much less tinged with ochraceous olive than a fema from India, and they are completely destitute even of the slightest tra of a reddish suffusion anywhere. No. 89164 has among the old bleache and abraded rectrices a new one, unabraded, deeply colored, but of fu length, and not so young as to show any trace of the outer follicle fro which it sprung. This feather is probably grown out to replace an a cidental loss; but if the bird at the following moult was going to assu the red plumage, this feather, I think, would have shown the charact of the latter. It is, however, exteriorly edged with greenish yello without a trace of red.

The same individual shows another peculiarity in the coloring of t tail, as all the old rectrices have the tips decidedly darker, in stro contrast to the remaining part of the feathers, thus forming a w marked terminal band, the more distinct as there is a faint indicat of a subapical lighter one. In none of the other specimens is th any similar pattern, nor is it indicated on the new rectrix of the sa bird, mentioned above.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Remarks.
					mm.	*mm.*	*mm.*	
92632	2303	Petropaulski	July —, 1883	ad.	.....	82	59	Red.
89162	1239	.....do	June 6, 1882	♂ ad.	.....	81	57	Do.
89163	1244	.....do	June 30, 1882	♂	145	84	56	Gray.
89164	1250	.....do	July 5, 1882	♂	152	79	56	Do.

No. 89162.—Iris dark hazel. Bill brownish gray; lower mandible light. Feet brownish gray.
No. 89163.—Iris, bill, and feet as foregoing. Testes large, swollen, size of a pea.
No. 89164.—Testes large, well developed.

The Scarlet Rose Finch is one of the commonest summer birds in the vicinity of Petropaulski, where it makes itself conspicuous by its sweet and pleasant song.

In 1883 I did not meet it there at all, as it had not arrived when I left Kamtschatka in the spring, and had already departed when, in the autumn, I once more landed in Petropaulski.

It did not occur on the island during my stay, and no instance of its capture there has been recorded.

Family HIRUNDINIDÆ.

121. Clivicola riparia (LIN.).

1758.—*Hirundo riparia* LIN., Nat. Syst., 10 ed., I, p. 192.—PALL., Zoogr. Ross. As., I, p. 535 (1826).—MIDD., Sibir. Reise, II, 2 (p. 189) (1853).—SCHRENCK, Reise Amurl., I, p. 389 (1860).—RADDE, Reisen Süden Ost-Sibir. (p. 281) (1863).—*Cotyle r.* SWINH., Ibis, 1861, p. 328.—*Id., ibid.*, 1863, p. 89.—*Id.*, P. Z. S., 1863, p. 287.—*Id., ibid.*, 1871, p. 346.—TACZAN., J. f. Orn., 1872, p. 353.—*Id., ibid.*, 1874, p. 334.—*Id.*, Orn. Fauna Vost. Sibir., p. 20 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 134.—*Id., ibid.*, 1882, p. 385.—BLAKIST. & PRYER, Ibis, 1878, p. 231.—*Iid.*, Trans. As. Soc. Japan, VIII, 1880, p. 211.—*Iid., ibid.*, X, 1882, p. 139.—SEEBOHM., Ibis, 1879, p. 30.—BLAKIST., Amend. List B. Jap., p. 21 (1884).

The Kamtschatkan specimens collected by me agree very well with birds from Western Europe, although being a shade darker. They also agree with them in the extent of the furcation of the tail, the distance between the tips of the longest and shortest tail-feathers being as great as the length of the hind toe *with* claw. In all the American specimens examined by me (sixteen) the same distance is hardly longer than the hind

without claw, this being the case even in specimens from Alaska. It ll therefore be well not to unite the two races, the American form being *ivicola riparia cinerea* (VIEILL.).

List of specimens obtained.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Wing.	Tail feathers.
					mm.	mm.
92692	2304	Petropaulski	July —, 1883	ad.	104	54
92691	2305	.....do	July —, 1883	ad.	102	55

It occurs in the vicinity of Petropaulski, but is not, as it would seem, very common. It has been said to visit the island of Bering occasionally, but I have doubts as to the correctness of the statement, as no specimens seem to have been obtained. It is certain that it was not seen there during my sojourn.

Three sets of eggs were obtained, measuring as follows:

U. S. Nat. Mus. No.	Stejneger No.	Diameters.
		Millimeters.
21801	2280	18.25 by 12
		17 by 12.5
		16.75 by 12.75
		17 by 12
		19 by 12.25
21802	2281	17.75 by 12.25
	2282	17.25 by 12.25
21773	2279	18 by 12.5
		17.5 by 12.5
		16.75 by 12.5
		17 by 12.5
		18 by 12.25
		16.25 by 12

All the eggs were very evenly and regularly speckled with n black dots. These could be washed away completely from the freal while now, a year afterwards, they are difficult to remove, if it done at all.

122. Chelidon tytleri (JERD.).

1826.—*Hirundo domestica* var. PALL., Zoogr. Ross. Asiat., I, p. 530 (*part*).
1853.—*Hirundo rustica* var. *rufa* MIDDEND., Sibir. Reise, II, 2 (p. 188) (*nec* GMEL.).
1858.—*Hirundo rufa* KITTLITZ, Denkwürd., II, p. 196 (*nec* GMEL.).
1862.—*Hirundo rustica* RADDE, Reise Süden Ost-Sibir. (p. 278) (*nec* LIN.).
1864.—*Hirundo tytleri* JERDON, Birds of India, III, p. 870.
1876.—*Hirundo americana* BLAKIST., Ibis, 1876, p. 331.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 211 (*nec* WILSON).
1882.—*Hirundo erythrogastra* BLAKIST & PRYER, Trans. As. Soc. Japan, X, p. 139 (*nec* BODD.)—BLAKIST., Amend. List B. Jap., p. 47 (1884).—*Chelidon erythrogaster* STEJNEGER, Pr. U. S. Nat. Mus., VI, 1883, p. 72.
1882.—*Hirundo gutturalis* TACZAN., Bull. Soc. Zool. France, 1882, p. 385 (*nec* SCOP.)—. DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 357.
1883.—*Hirundo saturata* "Stejneger MSS.," RIDGW., Pr. U. S. Nat. Mus., VI, 1883, p. 95.
1885.—*Hirundo rustica* subsp. *tytleri* SHARPE, Cat. B. Brit. Mus., X, p. 140.

A careful comparison with a large series of American specimens of *Ch. erythrogastra* shows the following differences:

1. As will be seen from the tables below, the dimensions agree pretty well, except that the lateral rectrices, although subject to great individual variation, are, on the average, considerably shorter in the American species, while the middle ones are of the same length.

2. The darkest American male is perceptibly paler than even the females of the Kamtschatkan form. In the latter species the color of the chin and throat is as deep as in the most richly colored specimens of the true European *rustica*, and the difference between the color of these parts and that of the breast and abdomen is very slight, and much less abrupt than in *Ch. erythrogastra*, and the trace of the black breast-band is more strongly indicated than in the latter. In *tytleri* the brown of the forehead reaches considerably higher up on the head, and the feathers of the tibia are whitish, strongly contrasted with the rich chestnut-rufous of the abdomen, while in *erythrogastra* they are hardly paler than those of the surrounding parts.

There seems thus to be little need of confounding these two birds, which may be considered distinct species, as no intergradation is known to occur. Nor is it likely that any will be found.

As to the Asiatic relatives of the Kamtschatkan species it may be remarked that Taczanowski describes two different forms, one darker, from Dauria and the Baical, and the other, a paler form, from Amur, Ussuri, and China. From the descriptions given by v. Schrenck, and especially by Taczanowski in J. f. Orn., 1875, p. 244, I have little hesitation in referring the latter to a form very closely allied to the Japanese true

Ch. gutturalis, with which they probably are even identical. I hav
fore me two skins collected by Swinhoe at Amoy, China, in April,
which agree pretty well with the description given by Taczanowski
on the other hand only differ slightly from Japanese specimens in
ing the pectoral black band perhaps a little more developed, the c
nut color only forming a patch on the middle of it, not interrupti
The upper surface has, besides, a faint greenish tinge, only see
young specimens of the Japanese form (*cf.* Taczanowski: "Der
liche Fleck auf dem schwarzen Brustbande," and "der schmale g
Schiller der oberen Theile des Körpers"). The measurements are g
below.

Birds from Dauria and Baical, or specimens of Jerdon's *tytleri* (E
of Indïa, III, p. 870, 1864) never came under my inspection, and
descriptions are extremely meager. The probability is, however,
they are identical with the Kamtschatkan bird. It is difficult to n
out from the scanty information if they differ from the latter, b
seems as if they, like the Egyptian *savignii*, have the spots on the
trices rufous-colored, and a more conspicuous black breast-band.
las describes a variety from Eastern Siberia as having "*arcus dilat
juguli chalybeato-ater, includens aream testaceam ovalem*," and "*ma
omnium rectricum, præter 2 medias, interioris vexilli rhombea, magna,
rugineo alba.*" This is most probably the Daurian and Baicalian bir
Taczanowski, in speaking of the lighter colored form (*gutturalis*,
above), says that the latter has "not even a trace of rusty color on
pure white spots of the rectrices," wherefrom we may infer that the s
mens of the dark form had such a tinge on those feathers. He
adds that in the light colored form, "the rusty patch on the b
breast-band is *as large as* in the Siberian swallows from the above-
tioned localities" (Dauria and Baical). Furthermore, Mr. Blyth, w
speaking of *tytleri* (Ibis, 1866, p. 336), compares it with *Ch. cah
(=savignii)*, giving as the distinctive character that it "has much le
the black gorget," not mentioning any difference in the color of
spots on the rectrices. The gorget is therefore smaller, but it is
dently there, and this can hardly be said of the Kamtschatkan bird
which it is barely indicated.*

* Mr. R. Bowdle Sharpe, after the above was written, has examined the types
saturata, pronouncing them to be *tytleri*. The reason why I now accept this vie
correct is that the National Museum has lately received from Captain Blakiston's
lection a specimen obtained at Petropaulski which has the white spots on the
decidedly tinged with rufous. See also further on under "Conclusions."

Tables of dimensions.

Aa.—CHELIDON ERYTHROGASTRA ♂.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Longest tail-feather.	Shortest tail-feather.
						mm.	*mm.*	*mm.*	*mm.*
6019	Heerman	.....	Sacramento, Cal	.....	♂ ad.	.....	128	107	42
11008	Drexler	378	Fort Bridger, Utah	May 19, 1858	♂ ad.	.....	126	95	43
45932	Bischoff	.....	Sitka, Alaska	June —, 1866	♂ ad.	.....	119	77	40
54440	Dall	1741	Kutlut, Alaska	June 22, 1868	♂ ad.	.....	122	94	43
65481	Herendeen	42	Unalashka, Alaska	June 9, 1873	♂ ad.	.....	123	100	44
	Average measurements of five males					.....	124	95	42

b.—CHELIDON ERYTHROGASTRA ♀.

2191	Baird	2191	Carlisle, Pa	May 1, 1845	♀ ad.	.....	121	71	42
65482	Herendeen	28	Unalashka, Alaska	June 7, 1873	♀ ad.	.....	118	78	41
77186	Smith	158	Cook County, Illinois	May 13, 1870	♀ ad.	.....	113	81	40
76879	Turner	.....	Saint Michael's, Alaska	June 22, 1876	♀ ad.	.....	119	79	40
89939	Wells	.....	Grenada, W. I.	Apr. 3, 1882	♀ ad.	.....	112	70	39
	Average measurements of five females					.....	117	76	40

B.—CHELIDON GUTTURALIS.

27749	Swinhoe	.....	Amoy, China	Apr. —, 1867	.....	.....	114	88	40
27824	....do	.....	....do	Apr. —, 1867	.....	.....	117	96	41

C.—CHELIDON TYTLERI.*

28163	Stejneger	1234	Petropaulski, Kamtschatka	June 28, 1882	♂ ad.	192	118	102	38
28162	....do	1235	....do	June 28, 1882	♀ ad.	175	116	87	41
28164	....do	2296	....do	Aug. —, 1883	(♂) ad.	.....	124	116	41
28165	....do	2297	....do	Aug. —, 1883	(♀) ad.	.....	119	82	44
	Average measurements of two males					.....	121	109	40
	Average measurements of two females					.....	118	84	42

*In most cases the right lateral tail-feather is longer than the corresponding rectrix on the left side. Here the measurements of the longest one is invariably given, as also in the tables above.

The Brown-bellied Swallow breeds abundantly in and about Petropaulski, where I met it during the months of June and July, 1882. When, in 1883, I left the town, on one of the latter days of May, they had not yet arrived from the south, and at my arrival there again in the middle of September the last one had already disappeared, so that

their whole sojourn lasts less than three months. Mr. Joseph Lugebil has kindly informed me that the swallows arrived on June 3, and disappeared August 19.

During the migration in spring a few stragglers sometimes pay a flying visit to Bering Island. Thus two were reported from the North Rookery on June 19, 1883, and another was observed at Ladiginsk three days later.

A single egg left in the nest was procured in the fall. It was white, heavily spotted with lilac and sepia brown, resembling those of *Ch. erythgastra* and *rustica*. The dimensions are 18 by 13.5^{mm}.

Family MUSCICAPIDÆ.

123. Butalis sibirica (GMEL.).

1788.—*Muscicapa sibirica* GMEL., Syst. Nat., I, 2, p. 936.—SCHRENCK, Reise Amurl., I, p. 377 (1860).—RADDE., Reisen Süden Ost-Sibir. (p. 271), (1863).—*Hemichelidon s.* SWINH., P. Z. S., 1863, p. 288.—*Id., ibid.*, 1870, p. 244.—BOLAU. J. f. Orn., 1880, p. 122.— *Butalis s.* SWINH. P. Z. S., 1871, p. 379.—TACZAN., J. f. Orn., 1872, p. 446.—*Id., ibid.*, 1875, p. 249.—*Id.*, Bull. Soc. Zool. France, 187[illegible] p. 168.—*Id.*, Orn. Fauna Vost. Sibir., p. 31 *ter.* (1877).—(?) BLAKIST. & PRYER, Ibis, 1878, p. 234.—*Id.*, Trans. As. Soc. Japan, X, 1882, p. 148.—DYBOWSKI, Bull. Soc. Zool., France, 1883, p. 362.—SEEB., Ibis, 1884, p. 37.—BLAKIS[illegible] Amend. List B. Jap. p. 50 (1884).

1826.—*Muscicapa fuscedula* PALL., Zoogr. Ross. As., I, p. 462.—DYBOW. & PARVEX, [illegible] f. Orn., 1868, p. 333.

1853.—*Muscicapa pondiceriana* MIDD., Sibir. Reise, II, 2 (p. 188).

1858.—*Muscicapa infuscata* KITTL. Denkw., II, p. 197 (*nec* HARTL.) (*cf.* J. f. Orn., 185[illegible] pp. 48 and 51).

1867.—*Muscicapa cinereoalba* WHITELY, Ibis, 1867, p. 199 (*nec* TEMM. & SCHLEG.).

The great "bird-wave" of the spring of 1883 caused one mornin[illegible] the whole northern part of Bering Island to swarm with these inhabtants of the mosquito-suffering Kamtschatka. During two weeks the[illegible] could be met with everywhere, but especially in deep ravines or betwee[illegible] the sand dunes, in fact, in all places sheltered from the chilling "norther[illegible] Always in movement, flitting from one dry stalk of the large *Archangelica officinalis* to another, or from cluster to cluster of the yellow flowers of the lovely *Rhododendron chrysanthum*, their small parties of four to six individuals gave the otherwise uninviting places a new attraction. Not only was their *'st, 'st*, and *chee-rrek tek, tek!* heard in the immediate neighborhood of the village, but all over the northern portion. A few extracts of my journal will give an idea of this phenomenon, which, during the spring of 1883, made Bering Island a sort of Heligoland from an ornithologcial point of view. Under June 8, I find: "A large number of

gray Fly-catchers must have arrived yesterday or last night, as six specimens were shot to-day and at least ten or twelve observed. Yesterday the wind was south, changing during the night to east, variable in force from very light to fresh." The following day I saw at least nine and shot five. The 10th two were shot and several seen. Counted more than twenty on the 11th; shot but four. And thus some were observed almost every day until the 21st, when the last was seen and shot. It may be, however, that several lingered around the shores of the island for a still longer time, as a few days afterward I left Bering Island in order to visit Copper Island.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*	*mm.*
92543	2140	Bering Island	June 8, 1883	♂ ad.	140	17	85	55
92540	2142	....do	June 8, 1883	♂ ad.	138	17	83	54
92538	2150	....do	June 9, 1883	♂ ad.	133	18	79	54
92546	2154	....do	June 10, 1883	♂ ad.	138	17	82	54
92542	2161	....do	June 11, 1883	♂ ad.	137	20	82	52
92547	2169	....do	June 12, 1883	♂ ad.	141	21	84	57
92539	2135	....do	June 8, 1883	♀ ad.	131	15	82	51
92537	2139	....do	June 8, 1883	♀ ad.	137	20	80	54
92536	2138	....do	June 8, 1883	♀ ad.	135	17	82	54
92541	2144	....do	June 8, 1883	♀ ad.	136	19	79	51
92539	2145	....do	June 9, 1883	♀ ad.	136	21	82	54
92544	2155	....do	June 10, 1883	♀ ad.	133	16	79	52
92535	2180	....do	June 7, 1883	♀ ad.	133	16	83	51
		Average measurements of six males			138	18	82	54
		Average measurements of seven females			134	18	81	52

No. 92543.—Iris dark brown. Bill horny brownish black, below at base yellowish gray; angle of mouth yellow. Feet dark grayish brown; toes below yellow. Testes large, swollen.
No. 92545.—Colors similar. Testes large, swollen.
No. 92541.—Ova small, not swollen.
No. 92535.—Eggs small.

From the table above it will be seen that the difference in size between the two sexes amounts almost to nothing. The difference in color is also very inconspicuous, the females, on the average, being a shade darker than the males.

124. Erythrosterna albicilla (PALL.).

1826.—*Muscicapa albicilla* PALL., Zoogr. Ross. As., I, p. 462, tb.—*Erythrosterna albicilla* SWINH., P. Z. S., 1862, p. 317.—*Id.*, *ibid.*, 1871, p. 380.—DAVID & OUST., Ois. Chine (p. 120, pl. 79) (1877).

1837.—*Muscicapa leucura* SWAINS., Nat. Hist. Flycatch., p. 253 (*nec* GMEL.).—*Erythrosterna l.* SWINH., Ibis, 1860, p. 357.—*Id.*, *ibid.*, 1863, p. 92.—*Id.*, *ibid.*, 1870, p. 247.—*Id.*, P. Z. S., 1863, p. 290.—*Id.*, *ibid.*, 1871, p. 380.—TACZAN., J. f. Orn., 1872, p, 448.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, Orn. Fauna Vost. Sibir., p. 31, *ter.* (1877).—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 362.

1858.—*Muscicapa parva* KITTL., Denkw., II, p. 308 (*nec* BECHST.) (*cf.* HARTL., J. f. Orn., 1859, p. 50).—SCHRENCK, Reise Amurl., I, p. 374 (1860).—RADDE, Reisen Süden Ost-Sibir. II, (p. 267) (1863).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 333.

1860.—*Thamnobia niveiventris* SWINH., Ibis., 1860, p. 54.

1861.—*Erythrosterna mugimaki* SWINH., Ibis, 1861, p. 330 (*nec* TEMM. & SCHLEG.).

1881.—*Muscicapa lutcola* BOLAU, J. f. Orn., 1881, p. 56 (*nec* PALL.).

The White-tailed Flycatcher was not seen by me in the vicinity of Petropaulski, but occurs, without being very common, however, in the woods farther in the interior.

When, in the spring of 1882, I returned to Bering Island from a short trip to Petropaulski, on the steamer Alexander II, a fine male of this bird was caught alive on board, 50 miles off the shore of Kamtschatka. Curious enough, a female of the same species was shot on Bering Island at Ladiginsk that same morning, and brought to me upon my arrival. It is the only one from the island, where, of course, it is but a casual visitor.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm.
92548	2064	Fifty miles off Kamtschatka	May 29, 1883.	♂ ad.	135	26	69	52
92549	2065	Bering Island	May 20, 1883.	♀ ad.	124	.....	64	47

Iris dark brown. Bill and feet black.

Family MOTACILLIDÆ.

125. Anthus gustavi SWINH.

1860.—*Anthus arboreus* var. G. R. GRAY, P. Z. S., 1860, p. 350.

1863.—*Anthus gustavi* SWINHOE, P. Z. S., 1863, p. 90.—*Id.*, Ibis, 1874, p. 442.—SEEB[illegible] Ibis, 1877, p. 129.—*Id.*, *ibid.*, 1878, p. 341.—TWEED., Ibis, 1877, p. 258.—SHARPE, Ibis, 1879, p. 262.—BLAKIST. & PRYER, Trans. As. Soc. Japan, 1882, p. 153.—*A.* (*Agrodroma*) *g.* SWINH., P. Z. S., 1863, p. 273.—*Corydalla* [illegible] *Id.*, *ibid*, 1871, p. 366.—TACZAN., Orn. Fauna Vost. Sibir., p. 28 bis (1877).—*Id.*, Bull. Soc. Zool. France, 1882, p. 389.—*Id.*, Ibis, 1883, p. 575.

1869.—*Anthus batchianensis* G. R. GRAY, Handl., I, p. 251.

1873.—*Anthus cervinus* TACZAN., J. f. Orn., 1873, p. 112.

1875.—*Anthus seebohmi* DRESSER, Birds of Eur. (pt. xlv).—FINSCH, Ibis, 1876, p.

1883.—*Anthus* sp. STEJNEGER, Pr. U. S. Nat. Mus., 1883, p. 71.
1883.—*Anthus japonicus* (?) RIDGW., Pr. U. S. Nat. Mus., 1883, p. 95, (*nec* TEMM. & SCHLEG.).
1883.—*Anthus stejnegeri* RIDGW., Pr. U. S. Nat. Mus., 1883, p. 95.—*Id.*, *ibid.*, p. 369.
1883.—*Pipastes agilis* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 361 (*nec* SYKES, *nec* SWINH. !).

Anthus stejnegeri shares the fate of *Anthus seebohmi*. As the gentleman in honor of whom the latter name was given was compelled to reduce it to a synonym of *Anthus gustavi*, so will I have to reduce the name given in honor of me to a synonym of the same species. Well, it is a funeral, but it is for the benefit of all concerned, and therefore we are not very sorry for it. But these and many other funerals could have been avoided, if the first describers of a species had used such terms for the colors they intended to indicate, as would enable other people to recognize the bird from their description. It very often happens that in a diagnosis the author says chestnut where he ought to have used rusty, buff, or some similar term. Is it too much to ask that a man who introduces a new name into science should know the names of the colors? As the earlier descriptions of this species are more or less defective, and especially so the original description of Swinhoe, I think it advisable to reprint here Mr. Ridgway's careful and detailed description (Pr. U. S. Nat. Mus., 1883, p. 95), from specimens collected by me on Bering Island.

Adult, summer plumage: Above light raw-umber brown, very distinctly streaked with black, these markings broadest on the back, the exterior feathers of which have the inner webs chiefly dull whitish, producing, when the feathers lie in natural position, a distinct stripe on each side of the interscapular region; scapulars much less distinctly streaked with dusky, and without light edgings; middle wing coverts dusky, broadly and very distinctly streaked with brownish white; greater coverts more narrowly tipped with brownish white or very pale buff, and edged with light brown; remiges dusky, edged with light brown; middle rectrices similar, but others dusky, the outer pair mostly dull brownish white, or pale dull buff, with a dull brownish dusky space along edge of basal half of inner web; next feather with the outer web pale dull brownish buff, and the inner web with the terminal portion and stripe along shaft, nearly to the base, of the same color. Lower parts buffy white, the whole jugulum yellowish buff, of varying intensity, and distinctly, though not always sharply, streaked with dull black; superciliary stripe and side of head generally pale buff, the auriculars more brownish, especially along upper margin, where sometimes streaked with dusky; a small dusky spot immediately in front of eye, and throat sometimes bordered along each side by an interrupted series of narrow blackish streaks (these usually, however, nearly or quite obsolete); sides and flanks streaked with blackish, and longer lower tail-coverts also sometimes streaked. First, second, and third quills longest, and nearly equal (first, however, usually longest), fourth decidedly (.15 of an inch or more) shorter.

The most characteristic feature of this bird, and especially strongly marked in the living bird, the feathers of which are not out of their proper

places as in the skinned specimens, are the two distinct stripes on each shoulder, the outer one black, the inner yellowish white, caused by one row of feathers on the shoulder having the outer and inner webs thus differently colored. Equally well marked is a round black spot on each side of the neck, which in the skin is dissolved into a cluster of smaller dark spots, but which in the living bird run together into a solid patch.

To the remarks of Mr. Ridgway I have nothing to add, except that the individual variation is still larger in the series collected during the second summer. No. 92666 is especially conspicuous for the rich deep buff of the under tail-coverts and the outer rectrices. In none of the specimens, however, occurs a color which, even approximately, can be called "chestnut."

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.*	Tail-feathers.
					mm.	mm.	mm.	
88990*	1118	Bering Island	May 30, 1882	♂ ad.	166	.....	85	
88991*	1119	.....do	May 30, 1882	♂ ad.	165	.....	83	
88989*	1174	.....do	June 6, 1882	♂ ad.	162	.....	85	
89134*	1211	Copper Island	June 18, 1882	♂ ad.	172	.....	85	
92666	2121	Bering Island	June 4, 1883	♂ ad.	164	33	86	
92668	2126	.....do	June 4, 1883	♂ ad.	163	34	85	
92673	2131	.....do	June 7, 1883	♂ ad.	157	31	81	
92671	2151	.....do	June 9, 1883	♂ ad.	161	27	84	
92672	2160	.....do	June 11, 1883	♂ ad.	169	33	85	
92669	2171	.....do	June 14, 1883	♂ ad.	157	28	82	
92670	2177	.....do	June 15, 1883	♂ ad.	170	34	84	
92665	2221	Copper Island	July 7, 1883	♂ ad.	160	.....	83	
89135*	1231	.....do	June 24, 1882	♀ ad.	.....	.....	79	
92667	2125	Bering Island	June 4, 1882	♀ ad.	162	32	82	

* Types of *Anthus stejnegeri* RIDGW.

No. 88990.—Iris dark brown. Bill flesh-color; culmen and tip horny brown. Feet brownish flesh-color.

No. 89134.—Bill blackish brown; basal half of the lower mandible flesh-colored.

Schlegel's Titlark is one of the commonest land birds on the Commander Island,* and may, during the summer months, be found every-

* Dr. Dybowski has committed a curious and most serious blunder by confounding this bird with the Tree-pipit. He states that the latter (*P. agilis*) occurs on the islands, while of *A. gustavi* he says, "cette espèce se recontre seulement à Kamtschatka, et n'a pas été trouvée sur les îles." (Bull. Soc. Zool. France, 1883, p. 361.) The fact is quite the reverse.

the lower places where grass grows abundantly, whether the swampy tundra or the dry sand dunes; but also on the hillsides, sometimes even on the more elevated *Empetrum* and ...dron tundra is the "*Inkatschugi*"* of the Copper Islanders to ..., but never higher up on the mountains.

...y, but always in movement and cheerful, the Titlark makes ...spicuous feature, especially on the few sunny days, when, ...h in the air, it trills its very well-meant but rather monotonous ...odious song (if this wooden-sounding chirping really can be ...ng) while on the wing. Besides this, it has another short ...what like *tsirrrrrr*, *tsip*, *tsip*, *tsip*, and the call-note is a short ... The warning-cry is similar, but louder and harsher.

...rival at the islands in spring takes place in the latter part of ...and the pairs soon select their homes and commence the breed- ...siness, and the first eggs in 1883 were obtained as early as the ... of May; on Copper Island, I met fully-fledged young on the 9th ..., 1883. They do not content themselves with one brood, how- ..., the eggs of the second laying being frequently found in July. The ... which I took on Copper Island, on July 13, had not yet received ... full number, as it only contained two fresh eggs.

The nests consist of dry grasses exclusively, and never contained a ...gle feather, in that respect constantly differing from those of *Calca- ...us lapponicus* and *Plectrophenax nivalis*. The dimensions of the nests ...verage: External diameter, 90mm; internal diameter, 45mm.

The eggs are very much like those of *Anthus ludovicianus*, with the ...sual great variation, the general coloration showing all shades between ...live gray and violet gray. In Nos. 21768 and 21767 the mottlings are ...venly distributed all over the egg, while, in 21818 they run together ...to a ring around the thick end. One egg of the latter set is curiously ...ong and narrow.

* An Aleut name, as they have no Russian appellation for this bird. On Bering ...land, where the Longspur is more conspicuous, the Titlark is simply called "another ...nd of *tschelutschék*" for distinction.

Dimensions of the eggs.

U. S. Nat. Mus. No.	L. Stejneger No.	Locality.	Date.	Diameters.
				Millimeters.
21767	2259	Glinka, Copper Island	July 13, 1883	20 by 15
21768	2222	Karabelnij, Copper Island	June —, 1883	20 by 15
				19.75 by 15
21818	1391	Severnij, Bering Island	July —, 1882	20 by 15
				21 by 15
				26 by 14
				20 by 14.75

126. Pipastes maculatus (HODGS.).

1844.—*Anthus maculatus* HODGS., Gray's Zool. Misc. (p. 83).—BROOKS, Ibis, 1876, pp. 499 and 504.—SEEBOHM, Ibis, 1879, p. 34.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 219.—*Id., ibid.*, X, 1882, p. 153.—STEJNEGER, Naturen, 1884, p. 6.—BLAKIST., Amend. List B. Jap., p. 52 (1884).

1847.—*Anthus arboreus* var. TEMM. & SCHLEG., Fauna Japon. Aves (p. —, pl. 23).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 334.—BOLAU, J. f. Orn., 1881, p. 56.—*Anthus arboreus* MIDDEND., Sibir. Reise II, 2 (p. 163) (1853).—KITTL., Denkw., I, p. 335 (1858).—SCHRENCK, Reise Amurl., I, p. 335 (1860).—RADDE, Reisen Süden Ost-Sibir. (p. 223) (1863).—PRZEW., Putesch. Ussur. (p. 37) (1870).

1860.—*Anthus agilis* SWINH., Ibis, 1860, p. 55 (*nec* SYKES qui *A. trivialis* L.).—*Id., ibid.*, 1861, pp. 36, 333.—*Id., ibid.*, P. 1863, p. 310.—*Id.*, P. Z. S., 1863, p. 273.—STEJNEGER, Naturen, 1882, p. 182.—*Pipastes a.* SWINH., Ibis, 1870, p. 347.—*Id., ibid.*, 1871, p. 366.—*Id., ibid.*, 1877, p. 144.—TACZAN., J. f. Orn., 1873, p. 84.—*Id., ibid.*, 1874, p. 335.—*Id., ibid.*, 1875, p. 194.—*Id., ibid.*, 1881, p. 183.—*Id.*, Bull. Soc. Zool. France, 1876 p. 159.—*Id., ibid.*, 1878, p. 136.—*Id., ibid.*, 1882, p. 389.—*Id.*, Orn. Faun. Vost. Sibir., p. 29 bis (1877).—DAVID & OUST., Ois. Chine (p. 308) (1877).—SEEB., Ibis, 1879, p. 34.

1883.—*Anthus gustavi* DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 361 (*nec* SWINH.).

The Tree-pipit is one of the commonest summer birds on the birch-clad heights surrounding Petropaulski. Its chirping note is heard everywhere. This noisy fellow is a great annoyance to the ornithologist who cautiously creeps along the shrubberies and bushes, as its anxious cry warns the nobler game he watchfully pursues, like the gulls on the sea-shore, who often frustrate the prettiest scheme of the gunner their malicious outcry.

In 1883 I noted its arrival at, and departure from Petropaulski. The first birds arrived during the 23d of May. Next morning they were already heard singing in several places, and some specimens were

In the autumn the last one was seen on one of the last days of
ber.

were seen on the islands.

good and detailed description of this bird in summer plumage is
t to find in the literature, I have thought it useful to present the
ing one, originally prepared by Mr. Robert Ridgway:

summer plumage, U. S. Nat. Mus. No. 89152; *L. Stejneger, No.* 1238. *Petropaulski, Kam., June* 29, 1882.

um grayish brown (more fulvous anteriorly), distinctly streaked with black, ries of streaks along each side of crown much the broadest; nape, back, scapu- ump, upper tail-coverts and middle pair of tail-feathers uniform brownish gray; athers of the back, also the longer upper tail-coverts, with very indistinct darker -streaks, the rump tinged with light olive green; wings brownish gray, but de- lly tinged with yellowish olive, especially on outer edges of primaries and their rts; middle coverts blackish dusky (in distinct contrast with prevailing color of g), broadly margined terminally with dull whitish; greater coverts also blackish trally, but this mostly concealed, and the tips of the feathers somewhat lighter n their edges, but not sufficiently so to produce a distinct bar. A distinct super- iary stripe of dull buffy whitish, bordered below by a dusky loral and postocular ne; a broad and continuous malar stripe reaching to side of neck, with whole chin nd throat absolutely immaculate buff, the throat bordered on each side by a subma- ar black streak, broken posteriorly into rather sparse specks; jugulum fainter buff, ut this soon fading into dull white on breast and other lower parts; entire jugulum and upper breast very heavily spotted with brownish black, their markings begin- ning very abruptly (with a concave outline) and continued backward along the sides, but becoming gradually narrower, until on the flanks they form narrow and rather indistinct streaks; whole belly, anal region, and crissum absolutely immaculate. Rectrices (except middle pair) brownish dusky, the outer pair with most of the outer web and a considerable portion of the inner web (extending along shaft for about 32mm), the next with a terminal spot only about 10mm long, the other rectrices without whitish on inner webs; outer webs of all strongly tinged with olive yellow toward bases.

First, second, third, and fourth quills longest, and very nearly equal, and reaching bout 10mm beyond tips of tertials.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm
152	1238	Petropaulski	June 29, 1882	♂ ad.	162	.....	84	
963	2054	.....do	May 24, 1883	♂ ad.	167	30	87	
964	2298	.....do	July —, 1883	ad.	.....	.....	86	

No. 89152.—Iris dark brown. Bill horny brown, lower mandible at base, and angle of mouth, fl
ored. Feet brownish flesh-color.

No. 92963.—Iris dark brown. Upper mandible and tip of lower mandible horny blackish br
part of the latter flesh-colored. Feet light grayish flesh-color, joints a little darker. T
swollen

It will be seen that the above measurements do not differ f
of *P. trivialis* (LIN.).

127. Budytes flavus leucostriatus (HOM.).

1826.—*Motacilla flaveola* PALL., Zoogr. Ross. As., I, p. 501 (*part*).
1853.—*Motacilla flava* MIDD., Sibir. Reise, II, 2 (p. 168).—SCHRENCK, R
I, p. 345 (1860).—RADDE, Reisen Süden Ost-Sibir., II (p. 229) (186
Ibis, 1878, p. 423.—BOLAU, J. f. Orn., 1880, p. 120.—*Id.*, *ibid.*, 18
Budytes f. SWINH., Ibis, 1861, p. 411.—*Id.*, *ibid.*, 1862, p. 260.—
1863, p. 274 (*part*).—*Id.*, *ibid.*, 1871, p. 364.—BAIRD, Trans. Chic
1869 (p. 312, pl. XXX, fig. 1).—DALL & BANN., *ibid.*, I, 1869, p. 22
Abh. Brem. Nat. Ver., III, 1872, p. 37.—TACZAN., J. f. Orn., 1
Id., Bull. Soc. Zool. France, 1876, p. 150.—*Id.*, *ibid.*, 1882, p. 38
Fauna Vost. Sibir., p. 34.—FINSCH, Verh. Zool. Bot. Ges. W
257.—BEAN, Pr. U. S. Nat. Mus., 1882, p. 147.—STEJNEGER, N
p. 182.—*Id.*, Pr. U. S. Nat. Mus., 1883, p. 72.—DYBOWSKI, Bul
France, 1883, p. 360.—NELSON, Cruise Corwin, p. 62 (1883).—T
1885, p. 157.
1878.—*Budytes leucostriatus* HOMEY., J. f. Orn., 1878, p. 128.—TACZAN., Bul
France, 1878, p. 128.
1882.—"*Budytes leucostria* HOM.," TACZAN., Bull. Soc. Zool. France, 1882,

E. v. Homeyer, in 1878 (J. f. Orn., p. 128), described a spec
Baikal as *B. leucostriatus*, of which he said that "it is the lar
the *Budytes*" (ulna 3″ 3‴ = 84^{mm} and tarsus 11‴ = 28
although these measurements are considerably larger than tl
birds, and though the latter on the whole in many respects
his description, I hesitate very little in referring them to
Homeyer made up his diagnosis from one specimen only (unf
he does not state in what season the bird was collected), an
vidual variation among the *Budytes* are so great as to easily a
the differences. I, therefore, think that Taczanowski from wh
meyer received his type specimen is right in referring all th
Asiatic *Budytes* with white superciliary streak to this form t
also has referred the Kamtschatkan bird.

Looking at the tables below we will find that the dimensi
specimens collected by me are somewhat inferior to those g
Homeyer, but that they agree pretty well with two splendid
of the true *flavus* from Germany in the National Museum's
except that the bills and toes of the former are considerably la

As to the color, it may be remarked that my specimens, in th
of the yellow color, come very close to those from Germany, b
tint of the yellow is somewhat different, being in the latter,
in one of the specimens, of a rather orange tinge, while in
the yellow is of a more greenish character, the sides especi

marked with olive. The gray of the upper head is less clear in the Kamtschatkan bird, and the white on the chin is, perhaps, on the whole, of a greater extent; but in this respect there is great variation, specimens of both forms being found quite alike. The character, however, which to me seems worth most consideration, is the decided blackish color of the eye-streak and the ear-patch, these parts being only brownish gray in the European specimen before me.

I have also compared my specimens with a fine series of the Alaskan bird, most of which were collected by Mr. Lucien M. Turner, at Saint Michaels. These are of the same size, having bills and toes somewhat intermediate between the European and the Kamtschatkan examples. In color they are rather duller, especially showing a universal tendency to olivaceous dusky spots on the breast, and although the eye-streak and the ear-patch, on the whole, are as dark as in my birds, still a few show this character less pronounced. It is proper to add that I have seen European specimens which were almost as dull colored as those from Alaska.

While it in some instances might not be safe to refer a specimen to one or the other form without having a series of both forms at hand, or without knowing the locality, still there is enough difference to warrant their subspecific separation. It may, besides, be well to bear in mind the seeming difference of the Kamtschatkan specimens, especially in regard to the longer bill. It is a question well worthy the attention of later investigators and collectors.

List of specimens collected and their dimensions.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
[illegible]148	Stejn.	1253	Petropaulski	July 11, 1882	♂ ad.	173	.....	80	69	13	25
[illegible]149	..do ..	1247	....do.....	July 4, 1882	♂ ad.	166	.....	77	71	13	25
[illegible]674	..do ...	2072	Bering Island	May 23, 1883	(♂ ad.)	(162)	.....	79	70	12	25
[illegible]677	..do ...	2099	....do.....	May 24, 1883	(♂ ad.)	(170)	.....	81	71	13	25
[illegible]150	..do ...	1254	Petropaulski	July 11, 1882	♀ ad.	158	.....	75	65	13	24
[illegible]675	..do ...	2098	Bering Island	May 22, 1883	(♀ ad.)	(164)	.....	76	66	13	25
[illegible]678	..do ...	2118	....do.....	June 3, 1883	♀ ad.	155	39	76	62	13	24
[illegible]676	..do ...	2156	....do.....	June 10, 1883	♀ ad.	170	49	76	66	12	25
	Average measurements of four males.....					.....	.....	79	70	13	25
	Average measurements of four females.....					.....	.....	76	65	13	24

Dimensions of BUDYTES FLAVUS LEUCOSTRIATUS, *from Alaska.*

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	mm.	mm.	mm.	mm.
67821	Turner	50	Saint Michael's, Alaska.	July 7, 1874	♂ ad.	(173)	78	69	11	25
70163	do		do		♂ ad.		78	66	11	24
70787	do	1139	do	June 12, 1876	♂ ad.		79	67	11	24
73231	do	1877	do	June 1, 1877	♂ ad.		79	67	11	24
70788	do	1140	do	June 2, 1876	♀ ad.	(165)	76	69	11	23
73175	do		do		♀ ad.		75	63	12	23
86522	McKay	28	Nushagak, Alaska.	June 20, 1881	♀ ad.		72	61	11	24
92078	do		do	June 28, 1882	♀ ad.		73	63	12	23
	Average measurements of four males						78	67	11	24
	Average measurements of four females						74	64	12	24

Dimensions of BUDYTES FLAVUS.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	mm.	mm.	mm.	mm.
88500	v. Berlepsch.	3461	Kurhesse, Germany.	Apr. 18, 1878	♂ ad.	(168)	76	67	11	23
88501	do	2205	Hanover, Germany.	June 16, 1876	♂ ad.	(172)	80	73	11	23
	Average measurements of two males						78	70	11	23

Budytes leucostriatus is a common breeding bird in the environs of Petropaulski, being found during the months of June and July everywhere on the low marshy grounds surrounding the lakes, fresh-water ponds, and brackish lagoons of the vicinity.

On Bering Island their appearance is only occasional during the spring migration, notwithstanding Dr. Dybowski's statement that they breed there. None were seen in 1882, but in 1883, about the 20th of May a small flock arrived, of which several were shot for me. It is to be remarked that they had not arrived at Petropaulski on the 27th, in which place the ground was still covered with deep snow, though being situated much more southerly than the island. On Bering Island I now and then saw single individuals until June 10, when I observed two and shot one, at which time all the rest seemed to have left.

The birds shot on the island agree perfectly with those collected on the mainland of Kamtschatka. The Alaskan tribe is not known to migrate southward along the American coast. The probability therefore is that they travel over to the Asiatic side, thus following, in their migration to and from the summer haunts, the route by which they at an earlier date have invaded the nearctic regions. I have evidence at hand that a migration route from the Tschuktschi Peninsula crosses the mainland from Anadyr to the Siberian coast of the Okotsk Sea, thus completely avoiding Kamtschatka. The Alaskan *Budytes* probably follow this route, thus being separated from the Kamtschatkan stock, which probably takes another route. This would account for the difference between the examples as shown above. If this really be the case (and that can only be decided by specimens collected during the migration seasons on the Okotsk coast) the Kamtschatkan bird will have to be recognized as a separate race, as the theory here advanced rests upon the supposition of the Alaskan bird being identical with the form of the Northeastern Siberia.

We have here before us a plain case demonstrating the necessity of recognizing the finest differences between the related forms, if the aim of collecting specimens and studying them is to find out the laws ruling the living nature. If the ornithological system and the ornithological science has for object only the convenience of the museum director in determining the names to be put on the label, then it may be proper and convenient to ignore the finer characters, and throw different forms into the same pot, because it is difficult to trace a sharp line between them, or because there are individuals which the perplexed director does not know how to enter upon the register. But it is time that such an ornithology should be done away with. The birds are not there for the sake of the museums, but the museums for the birds.

128. Motacilla melanope Pall.

1776.—*Motacilla melanope* Pall., Reise Russ. Reich., III, p. 696.—*Id.*, Zoogr. Ross. Asiat., I, p. 500 (1826).—Tweed., Ibis, 1877, p. 310.—Blakist. & Pryer, Ibis, 1878, p. 237.—Seebohm, Ibis, 1879, p. 35.—Stejneger, Naturen, 1882, p. 182.—*Calobates m.* Swinh., P. Z. S., 1871, p. 364.—Tweed., P. Z. S., 1877, p. 546.—*C. melanops* Swinh., Ibis, 1874, p. 157.

1884.—*Motacilla sulphurea* var. *melanope* Seeb., Ibis, 1884, p. 39.

1788.—*Motacilla tschuktschensis* Gmel., Syst. Nat., I, p. 962.

1850.—*Pallenura jarensis* Bp., Consp., I, p. 250.

1853.—*Motacilla sulphurea* Middend., Sibir. Reise, II (p. 168).—Schrenck, Reise Amurl., I, p. 344 (1860).—Radde, Reisen Süden Ost-Sibir., II (p. 227), (1863).—*Pallenura s.* Tacz., J. f. Orn., 1873, p. 82.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, Ornith. Fauna Vost. Sibir., p. 34 (1877).

1847.—*Motacilla boarula* TEMM. & SCHLEG., Faun. Japan, Aves (p. 59) (*nec* SCOP., 1769).—KITTL., Denkw., I, p. 321, 1858.—SWINH., Ibis, 1860, p. 55.—*Id.*, *ibid.*, 1861, pp. 35 and 333.—*Id.*, *ibid.*, 1863, p. 309.—*Id.*, *ibid.*, 1866, p. 138.—*Id.*, P. Z. S., 1863, pp. 274 and 334.—BLAKIST., Amend. List B. Jap., p, 55 (1884).—BLAKIST., Ibis, 1862, p. 318.—DYBOW. & PARVEX, J. f. Orn., 1868, p. 334.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 220.—*Id.*, *ibid.*, X, 1882, p. 155.—BOLAU, J. f. Orn., 1880, p. 120.—*Id.*, *ibid.*, 1881, p. 55.

1855.—*Pallenura robusta* BREHM, Naumannia, 1855, p. 280.—*Id.*, J. f. Orn., 1857, p. 32.

1875.—*Budytes novæ-guineæ* A. B. MEYER, Isis, Sitzungsber., April, 1875 (fide Salvadori).

Not having sufficient material for determining whether the eastern and the western bird really are separable as races, or not, I leave the name and the synonymy as above, without further remarks, as, in that case, it would be the European bird, to which a trinominal appellation, viz, *M. melanope grisea* (MÜLL.), should be applied.

The Gray Wagtail is a common summer bird round Petropaulski, where it may be met with along all the small creeks and rivulets. They had not made their appearance in 1883 when I left on one of the last days of May, but a few birds were still observed during the first days of October of the same year.

Occasionally this species occurs on Bering Island during the migratory season, and, on account of the extraordinary spring of 1883, they were comparatively numerous during the second week of June. It is even possible that a few of them stopped to breed at some creek in the interior of the southern part, as a young bird was taken on board the steamer Aleksander on the 14th of September when about 20 miles southwest of the island.

They were rather shy and difficult to shoot.

List of specimens.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Remarks.
					mm.	mm.	
89147	1248	Petropaulski..	July 4, 1882	♂ ad.	178	.....	Iris dark brown.
92679	2146	Bering Island	June 9, 1883	♀ ad.	178	63	Iris dark brown. Feet grayish brown.
92680	2147	....do	June 9, 1883	♀ ad.	191	65	Feet a little lighter. Eggs swollen.

129. Motacilla ocularis SWINH.

1853.—*Motacilla alba* var. *lugens* MIDD., Sibir. Reise, II, 2 (p. 166) (*nec* KITTL., *nec* SCHRENCK, *nec* TEMM. & SCHLEG.).

860.—***Motacilla ocularis*** SWINH., Ibis, 1860, p. 55.—*Id.*, *ibid.*, 1863, pp. 94, 309.—*Id.*, P. Z. S., 1863, p. 275.—*Id.*, *ibid.*, 1871, p. 364.—TACZAN., J. f. Orn., 1873, p. 82.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, *ibid.*, 1875, p. 252.—*Id.*, Bull. Soc. Zool. France, 1876, p. 150.—*Id.*, *ibid.*, 1882, p. 389.—*Id.*, Orn. Fauna Vost Sibir., p. 33 (1876).—SEEBOHM, Ibis, 1878, p. 345.—*Id.*, *ibid.*, 1883, p. 92.—*Id.*, *ibid.*, 1884, p. 39.—RIDGW., Pr. U. S. Nat. Mus., 1881, p. 414.—*Id.*, *ibid.*, 1883, p. 145 (*part*).—BEAN, *ibid.*, 1882, p. 147.—NELSON, Cruise Corwin, p. 62, pl. (1883).—STEJNEGER, Naturen, 1884, p. 5.—BLAKIST., Amend. List B. Jap., p. 54 (1884).

861.—***Motacilla baicalensis*** var. *temporalis* SWINH., P. Z. S., 1871, p. 363.

On the 10th of June, 1882, I obtained on Bering Island a Gray-backed Wagtail, the sex of which could not be determined, and which at the time was referred to the same species as the other Wagtails (*lugens*), the last of which, in 1883, were observed just a month previous.

This late appearance led to a careful comparison, after my return to Washington, the result of which was that I now consider it to belong to *ocularis*.

As I have only one specimen of the latter species in good summer plumage, it must be admitted that my material has been rather scanty,* but as it agrees pretty closely with my Bering Island bird, not only in size but also in all the other points in which the former differs from typical summer specimens from Kamtschatka, it is thought that the conclusions arrived at are correct. It is next to be remarked that the difference of time between the date of the two birds is only sixteen days, and that the specimens from Kamtschatka selected for the comparison are the gray-backed females, one of which was killed only sixteen days earlier in the season than the Bering Island bird, and furthermore that the specimen of *ocularis* was collected by E. W. Nelson at Plover Bay, on the Tschuktschi Peninsula, and designated as a male† (U. S. Nat. Mus. No. 89676).

As already stated, the specimens from Bering Island and Plover Bay agree completely as to size and coloration,‡ so that any detailed comparison between them is superfluous. In these two specimens the back is "absolutely uniform plumbeous-gray." But placed alongside the Kamtschatkan specimens a brownish tinge is quite perceptible, while in the latter the color is purer bluish and occasionally clouded with blackish,

* I have since had the opportunity of comparing large series and find my conclusions, as set forth in the following, fully substantiated.

† As both sexes of *ocularis* have the back gray in summer, there is no reason for supposing that the determination of the sex of the present specimen is erroneous (*cf.* Ridgw., Pr. U. S. Nat. Mus., 1883, p. 146).

‡ *Cf.* also Ridgway's statement (*l. c.*) that No. 89676 "agrees minutely with No. 89688 in coloration."

...mark showing the ... comparison ... to the posterior ... of specs it ... the first half-quarters in ... more intensive ... the amount ... to undertake a ... however ... the white less ... have been ...

... show that our two birds ... between the males and ... on page ... to the wing and ... between the males ... Zool. ... the bills of the two ... shorter than in ... the wings.

... of specimens of the ... Mr. Webb as he ... probable that ...

Dimensions of M. OCULARIS.

U. S. Nat. Mus. No.	Collector's No.	Collector's name.	Locality.	When collected.	Sex and age.	Wing.	Tail-feathers.
						mm.	*mm.*
21181	y206	.....	China	.....	jun.	94	91
37729	....	Swinhoe ...	Amoy	— —, 1861	.....	85	.....
37677	356	Scammon ...	Plover Bay, Siberia	.....	.....	87	92
39676	1984	Nelson.....	.....do.....	June 26, 1881	♂ ad.	90	94

Only one lonely straggler was procured on Bering Island, a full month after the last *M. lugens* had been observed. Neither Kamtschatka nor the islands seem to be in the regular route of this species, as but one specimen is reported from the peninsula by Taczanowski. I myself did not meet it there. See also further on under "Conclusions."

130. Motacilla lugens KITTL.

1826.—*Motacilla albeola* var. PALL., Zoogr. Ross. As., I, p. 507.

1833.—*Motacilla lugens* KITTL., Kupfert., p. 16, tb. 21, fig. 1 (*nec* TEMM. & SCHLEG., Fauna Japon., 1847).—*Id.*, Denkwürd, II, p. 199, and p. 371 (1858).—"ILLIGER" GLOGER, Abänd. Vög., p. 148 (1833).—SEEBOHM, Ibis, 1878, p. 347 (in part only).

1833.—*Motacilla lugubris* GLOGER, Abänd. Vög., p. 148 (*nec* TEMM., 1820).—KEYS. & BLAS., Wirb. Eur., I, p. xlix (1840).—SCHLEG., Rev. Crit., p. 68 (1844) (*part*).—CABAN., Mus. Hein., I, p. 12 (1850).

1844.—"*Motacilla albeola* var. *camtschatca* PALL.," SCHLEG., Rev. Crit., p. 68.—ZANDER, Naumannia, 1858, p. 241.

1850.—"*Motacilla albeola* var. *camtschatica* PALL.," BONAP., Consp., I, p. 250 (*nec* SWINH., 1863, P. Z. S., p. 275, quæ *M. ocularis*).—SCHRENCK, Reise Amurl., I, p. 338 (1860).

1851.—*Motacilla alba lugens* ZANDER, Naumannia, 1851, IV, p. 13.—SCHRENCK, Reise Amurl., I, p. 338 (*nec* MIDDEND.).

1851.—*Motacilla leucoptera* "BREHM," ZANDER, Naumannia, 1851, IV, p. 14.

1863.—*Motacilla ocularis* SWINH., P. Z. S., 1863, p. 275 (*part*).—RIDGW., Pr. U. S. Nat. Mus., VI, 1883, p. 144.

1876.—*Motacilla japonica* BLAKIST., Ibis, 1876, p. 333 (*nec* SWINH.).—BOLAU, J. f. Orn., 1880, p. 119.

1878.—*Motacilla amurensis* SEEB., Ibis, 1878, p. 345, pl. ix.—*Id.*, *ibid.*, 1883, p. 91.—*Id.*, *ibid.*, 1884, p. 39.—BOLAU, J. f. Orn., 1881, p. 55.—*Id.*, *ibid.*, 1882, p. 333.—BLAKIST. & PRYER, Trans. As. Soc. Japan, X, 1882, p. 155.—BLAKIST., Amend. List B. Jap., p. 13 (1884).

1882.—*Motacilla kamtschatica* STEJNEGER, Naturen, 1882, p. 182.—*Id.*, *ibid.*, 1884, p. 5.—*Id.*, Pr. U. S. Nat. Mus., 1883, p. 71.—TACZAN., Bull. Soc. Zool. France, 1882, p. 388.

1883.—*Motacilla blakistoni* SEEB., Ibis, 1883, p. 91.—*Id.*, *ibid.*, 1884, p. 38.

Both v. Kittlitz, 1833, and Temminck, 1840, give Pallas as the au-

thority for the name *Motacilla lugens*, which, by later writers, has bee ascribed to Illiger; but, as far as I can detect, neither Pallas nor Illige have ever published such an appellation, which, probably, is a museu name only.* It will, however, stand on v. Kittlitz's authority, as it i unmistakably based upon the typical Kamtschatkan bird, and both th description and the figure are equally conclusive. That Temmine *afterward* confounded *lugens* with the Japanese species cannot make th name untenable for the species to which it clearly belongs.

It cannot be too often repeated that *M. lugens* TEMM. & SCHLEG. i inapplicable to the Japanese species, as it was given by v. Kittlitz t the quite distinct Kamtschatkan bird fourteen years earlier, and tha Swinhoe's name *japonica* must stand for the former.

Various authors have considered the Black-backed Kamtschatka Wag-tail identical with the Japanese species, while others, *e. g.*, Robe Ridgway, referred it to *Motacilla ocularis* SWINH. It is, however, distinct form, easily distinguishable in the male summer plumag although the females and the winter plumage are very difficult t separate from those of *ocularis*.

Little need be said as to its difference from *M. japonica*. The latt species has well-marked black cheeks, white chin, and both males an females have the back black.

On the other hand, it is the unanimous assertion of those who hav met *ocularis* in the interior of Siberia and on the Tschuktschi Peninsul that the males of the latter, even in summer, have a gray back lik that of the females, and that they never met a black-backed one. D Dybowski informed me that he has collected numerous specimens this species in all plumages, but never a male which was not gray, an that he has examined a series of about twenty summer birds, collecte in Tschuktschi Land, by the Russian Expedition for observing th Transit of Venus, all of which, both males and females, were unifor gray on the back. It is furthermore stated that the true *ocularis* is somewhat smaller bird than the Kamtshatkan form, the males bei hardly larger than the females of the latter.

The adult males of these three forms, in summer plumage, ma therefore, be distinguished thus:

* *Cf.* also Seebohm's "Rat-hunting" in Ibis, 1878, p. 349. Seebohm "lost scent (of *M. lugens* ILLIGER) altogether in Middendorff's 'Sibirische Reise,' p. (1851)." It may, however, be traced back to the same year as "*M. lugens* PALL.," to 1833, when it occurs in Gloger's "Abänd. Vögel," as cited above.

a¹. Cheeks and ear-coverts black. Back black; black of throat not reaching base of bill.....1, *japonica*.
a². Cheeks and ear-coverts white.
b¹. Back black; black of throat reaches base of bill.....2, *lugens*.
b². Back gray; black of throat reaches base of bill.....3, *ocularis*.

This difference in the color corresponds with the difference in their geographical distribution. From what can be learned from the literature, their occurrence in the summer plumage is about as follows:

1. *M. japonica* in Japan and the neighboring tracts of the mainland.
2. *M. lugens* in Kamtschatka and the adjacent islands; Japan.
3. *M. ocularis*, Baikal, Dauria, and the Tschuktschi Peninsula.

As to the probable differences between the females of *lugens* and the males of *ocularis*, I refer to what is said under the head of the latter species (p. 286), proposing here to give a description of the different plumages of *lugens*:

Old ♂.—*U. S. Nat. Mus. No.* 92685; *L. Stejneger No.* 2037. *Petropaulski, May* 17, 1883.

Iris blackish brown. Bill and feet black. Second and third primaries equal and longest, first very little shorter, considerably longer than fourth.

Posterior half of head, upper neck, back, and upper tail-coverts glossy black with a bluish tinge, on the left half of uropygium a gray patch, caused by feathers of the winter plumage not yet moulted; the lateral upper tail-coverts with broad white margins on their outer webs. A line through the eye, behind connected with the black of the upper neck, chin (the white at the base of the feather shining through, however,) throat, jugulum, and præpectus are, likewise, black with bluish gloss. Forehead and anterior half of crown, on the sides extended backward into a broad stripe behind and above the eye, further, the malar, subocular, and auricular regions as also the sides of the neck, and finally the lower surface, behind the præpectus, and the flanks pure snowy white, the latter suffused with gray. The wings are remarkable for the great extent of the white color, the four first primaries being wholly white, except for the terminal 25mm, which, together with a narrow stripe on the *outer* web along the shaft, are black, so that more than the basal two-thirds of the inner webs are white from margin to shaft. On the following primaries the black increases on the inner web, while the white edging of the outer one is getting broader. The large arm-coverts, as also the middle-coverts, are pure white, while the primary coverts have a black stripe on the outer web for the basal two-thirds. The lesser wing-coverts are dull black with the exterior edges shaded with gray; under wing-coverts and axillaries pure white. Tibial feathers blackish, the upper ones broadly tipped with white. The three middle pairs of rectrices are deep black, the interior one with a pure white edging on the outer web tapering towards the tip; the two lateral pairs are white with a black edging on the inner webs falling short of the tip, in the external pair by one-third of the feathers' length, in the following by one-sixth.

This is the most developed plumage of the old male, described by Mr. Seebohm as *M. blakistoni*.* The evidence is another male (No. 92684),

*Mr. Seebohm has added two synonyms to the species in question, describing the middle state as *M. amurensis*, the very old as *M. blakistoni*. When describing the first one he remarks that "in the present condition of ornithological literature, loaded with synonyms, any one who adds a name to the almost exhaustless list is guilty of a crime." We cannot agree with him there. It would have been a much greater

shot on the same day, out of the same flock, being intermediate in colo between that described and the "*amurensis*" state, as it has much les white on the primaries, a little less on the primary coverts, while th arm-coverts and middle ones are fully as white; the lesser ones ar blackish with broader and more distinct gray edges.

Old ♀.—*U. S. Nat. Mus. No.* 92688; *L. Stejneger No.* 2058. *Petropaulski, May* 24, 188

Iris very dark brown. Bill and feet black. Primaries exactly as in the mal Ova small.

Differs from the old male, described above, in having the back, including scap lars, plumbeous gray, strongly mottled with black, and more whitish on the chi The wing-feathers are quite similarly colored, only that the first primary on the ba half of the inner web has some faint dusky mottlings; the wing-coverts are al similar, except the lesser ones, which are gray. The lateral pair of tail-feathers pure white without black, and the following has the black margin of the same exte as in the lateral pair of the male; the third pair has a small terminal white stre on both sides of the shaft.

This would be the female *M. blakistoni*.

The following plumage is that most commonly met with. I ha nothing to add to Mr. Robert Ridgway's descriptions of the specime brought home by me, which are therefore only reprinted from his artic

Adult ♂.—*U. S. Nat. Mus. No.* 88986; *L. Stejneger No.* 1034. *Bering Island, May* 11, 18

Posterior half of crown, with occiput, glossy blue black; back, scapulars, and up tail-coverts, duller black, the rump mixed black and plumbeous gray; lesser wi coverts, uniform ash gray. Forehead, anterior half of crown, and broad supercili stripe, pure white; beneath this, a distinct black line, confluent with the black of t occiput, and extending thence forward along upper edge of auriculars to the eye, a from the latter across lores to the bill, but loral stripe rather indistinct anterior side of head below this black line, pure white; chin also white, but more or l mixed with blackish; throat and jugulum, uniform blue back, with a strongly con posterior outline; rest of lower parts, pure white, but tinged laterally with blu gray. Lateral upper tail-coverts with outer webs very broadly edged with whi middle rectrices black, the outer webs distinctly edged with pure white; next th rectrices, on each side, uniform brownish black; two outer rectrices (on each sid pure white, the inner web of the first with or without a very narrow edging of black along the middle portion, that of the second with a broader and more extend blackish edging. Exposed portion of middle and greater wing-coverts and outer w

---

crime if he had united these birds with other forms, for instance, *japonica* or *occ ris*. As it is he has attracted special attention to these birds, and furthermore, have his elaborate descriptions and a good plate. I venture to say that on the co trary it has been to the benefit of science, against which the load of the easi located synonyms is a trifle. It is not this kind of synonyms which is troublesom but those like *Motacilla lugens* TEMM., *nec* KITTL., *nec* ILLIG., *nec* and so forth, wh make gray hairs for the ornithologist. It may here be remarked that the phase "*bla toni*" has already, in 1859, been described by Zander as *leucoptera* BREHM, "aus Jap * * * Halsseiten weiss * * * durch die Augen ein schwarzer Streif. * * Die kleinen Deckfedern der Flügel schwarz, die mittleren und grossen ganz we von den letzteren bloss die erste am Schafte etwas grau," &c. See, however, un "Conclusions," about the possibility of *M. amurensis* being distinct.

of tertials (except first), pure white, appearing as a continuous, unbroken, elongated patch on the closed wing; inner webs of tertials, blackish; secondaries, grayish brown, the outer webs edged with white, but inner webs with no trace of white edging toward ends; primaries and their coverts, with alulæ, also grayish brown (or brownish gray) edged with white. Bill, uniform deep black. Feet duller black. Iris dark brown.

Adult ♀.—*U. S. Nat. Mus. No.* 88987; *L. Stejneger No.* 2031. *Bering Island, May* 11, 1882.

Similar to the adult ♂ as described above, but nape, back, and scapulars, uniform plumbeous gray, instead of black; chin black.

Specimens in autumnal plumage.—♂.—*U. S. Nat. Mus. No.* 92689; *L. Stejneger No.* 2597. *Petropaulski, September* 18, 1883.

Iris dark brown. Bill black, yellowish gray on basal half of lower mandible. Feet black.

Differs from the male in summer plumage in having the posterior half of the head and the back gray, the former with a slight yellowish wash and mottled with black; the white parts on the head are also suffused slightly with yellowish; the mentum is white, and the black feathers of the throat narrowly edged with whitish. Remiges and rectrices edged more conspicuously with white.

The female (U. S. Nat. Mus. No. 92690) killed on Staritskof Island, at the entrance of Avatscha Bay, Kamtschatka, September 23, 1883, by L. Stejneger, is similar, but has the yellowish tinge extended over the back, throat, and inner wing-feathers. The black on the throat is still more restricted.

List of specimens collected.

A.—DURING THE MONTHS OF MAY AND JUNE.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
						mm.	*mm.*	*mm.*	*mm.*
[illegible]	Stejneger.	1034	Bering Island	May 11, 1882	♂ ad.	203	.....	94	98
[illegible]	....do	1010	.....do.....	May 9, 1882	♂ ad.	196	.....	95	91
[illegible]	....do	1233	Petropaulski	June 27, 1882	♂ ad.	207	.....	91	90
[illegible]	....do	2010	Bering Island	May 5, 1883	♂ ad.	202	.....	94	97
[illegible]	....do	2030	Petropaulski	May 15, 1883	♂ ad.	208	.....	95	97
[illegible]	....do	2036	.....do.....	May 17, 1883	♂ ad.	.....	.....	97	97
[illegible]	....do	2037	.....do.....	May 17, 1883	♂ ad.	215	70	97	101
[illegible]	....do	1035	Bering Island	May 11, 1882	♀ ad.	189	.....	89	92
[illegible]	....do	2032	Petropaulski	May 15, 1883	♀ ad.	195	63	87	91
[illegible]	....do	2031	.....do.....	May 15, 1883	♀ ad.	192	.....	89	88
[illegible]	...do	2058	.....do.....	May 24, 1883	♀ ad.	198	.....	90	86
[illegible]	....do	2105	.....do.....	May 22, 1883	♀ ad.	(200)	.....	93	94
	Average measurements of 7 males					205	.....	95	96
	Average measurements of 4 females					193	.....	89	84

B.—DURING THE MONTH OF SEPTEMBER.

[illegible]	Stejneger.	2597	Petropaulski	Sept. 18, 1883	♂ ad.	212	66	96	97
[illegible]	....do	2641	Staritskof Island, Kamtschatka	Sept. 23, 1883	♀	.....	.....	93	97

The Black backed Kamtschatkan Wagtail is regularly seen on Bering Island during the migration season, usually making its first appearance in the early part of May, disappearing, however, towards the end of the month. They are only seen single, or a few together, and although convenient breeding places and plenty of food might be easily found, still they never remain to rear their young on the stony beaches of the Commander Islands.

Around Petropaulski they are numerous. In 1883 they arrived in the neighborhood later than usual, on account of the deep snow, which covered the country down to the very water's line. The first were seen in that year on the 15th of May, when I shot three out of a small flock of six. But I had already observed the first Wagtail on the much more northerly Bering Island eleven days before. In the autumn of the same year the last one was seen at Petropaulski about the first of October, but most of them had already left more than a week before that time.

In habits and voice it resembles very much the European *M. alba*, but seems to prefer the sea-shore to the banks of the creeks and rivulets which are the favorite resorts of its coquettish cousin, *M. melanope*.

Family TROGLODYTIDÆ.

131. Troglodytes pallescens (RIDGW.).

1882.—*Troglodytes fumigatus?* TACZAN., Bull. Soc. Zool. France, 1882, p. 386 (*nec* TEMM.).
1883.—*Anorthura pallescens* "Stejneger, MSS.," RIDGW., Pr. U. S. Nat. Mus., 1883, p. 93.—*Troglodytes p.* STEJNEGER, Zeitschr. Ges. Orn., I, 1884, p. 11.
1883.—*Troglodytes* n. sp. DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 357.

♂ *ad.*—*U. S. Nat. Mus. No.* 88994; *L. Stejneger No.* 1644. *Bering Island, September* 20, 1882.

Above dull smoky brown (far less rusty than in *A. alascensis*), uniform on pileum, nape, and upper back, but lower back and rump barred with dusky, the wing-coverts and upper tail-coverts still more distinctly barred with the same; middle wing-coverts tipped with a small deltoid spot of pure white; outer webs of five outer primaries spotted with brownish white, the remaining quills with outer webs plain dull brown. Tail brown, crossed by six or seven rather wide bands of blackish, the last three or four rendered more distinct by a decided lightening of the brown against their posterior edge; on the middle rectrices, however, the bars much less distinct and more irregular. Lores and indistinct superciliary stripe, malar region, chin, throat, jugulum, and sides of breast dull light-brownish buff (much paler and duller than in *A. alascensis*), the middle of breast and upper part of belly much paler, or inclining to brownish white; sides, flanks, and crissum brownish white, broadly and distinctly barred with dusky, the sides more tinged with brown. Auriculars dusky brown, streaked with the color of the throat. Bill brownish black, more brown on lower basal portion of mandible. "Iris dark brown." Legs and feet dark brown. (RIDGW., *l. c.*)

♀ ad.—*U. S. Nat. Mus. No.* 92532; *L. Stejneger No.* 1703. *Bering Island, October* 31, 1882.

Indistinguishable from the male described above, except by being a trifle smaller.

Jw.—*U. S. Nat. Mus., No.* 92523; *L. Stejneger No.* 2229. *Copper Island, July* 5, 1883.

Head above dark gray with a brownish tinge; loral space blackish; superciliary stripe only recognizable behind the eye; ear-coverts suffused with blackish. Back and rump a shade more rusty than in the adult, the black bars less distinct. Ground color of the lower surface similar to that of the adults, but as the dusky edges of each feather are much broader, the young seems dusky below with spots of pale buff, the throat being almost uniformly suffused with dusky; besides, the flanks and abdomen are more brownish. Wings and tails mostly like those of the adults, the longest tertial having the inner web uniform blackish-brown edged with brownish buff and without cross-marking; the white spots on the smaller wing-coverts less pure.

Troglodytes pallescens needs no comparison with *Troglodytes neglectus* BROOKS, from Cashmere, which has "the entire back from the mantle downwards distinctly barred with dusky blackish, remains of some of these bars even occurring on the hind neck," which has "about twelve bars distinguishable on the centre tail-feathers," and "the throat and chest dusky brown, with blackish cross-bars."

Nor should any comparison with *Troglodytes fumigatus* TEMM. from Japan be necessary. But as the *Troglodytæ* from the Pacific coasts have been sorely confounded by prominent writers, and especially of late by Mr. Taczanowski* it may not be out of place to indicate the differences:

1. *T. fumigatus* is decidedly smaller, with, both absolutely and proportionately, much smaller bill.

2. The general color of *fumigatus* is much darker and richer, both above and below, being in fact one of the deepest colored species of the group, while *pallescens* ranks among the palest and dullest.

3. In *fumigatus* the dusky cross-bars are more distinct and reach further forward, both on the upper and the lower surface, forming very distinct spots on the chest and in some species even on the throat. The bars on the tail are more numerous, and the longest tertiary has the inner web of the same color as the outer web, and is also distinctly barred

*Since this article was written Mr. H. Seebohm (Ibis, 1884, p. 41) has made a rather curious statement in regard to the forms here mentioned. He said: "To distinguish it [T. parvulus var. fumigatus] even as a variety from *T. alascensis* and *T. pacificus* can only be regarded as hair-splitting, the extremes in a series of any one variety overlapping the extremes of the nearest allied varieties." Not half a year before Mr. Seebohm committed the same "hair-splitting" (Hist. Brit. Birds, I, p. 506), and he does not state how great the additional material is upon which his new discovery is founded. The series of specimens from both sides of the Pacific I have had the opportunity of examining amounts to about sixty, and in view of these Mr. Seebohm's opinion is inexplicable to me. (Cf. what is said below about the intergradation. See also Ridgway's very important article in Pr. U. S. Nat. Mus., 1883, p. 370, on the same subject.)

with blackish dusky. The light spots on the sides of the neck are very pronounced, while only the ear-coverts are perceptibly light spotted in *pallescens*.

It might reasonably have been expected that the Wren occurring on the two westernmost islands of the Aleutian chain should belong to the same species as those inhabiting the other ones, viz, *T. alascensis*. As my friend, Robert Ridgway, however, has already given (*l. c.*) a careful comparison of the two forms, I shall here only repeat the most striking differences between the adults, viz, that *pallescens* has the posterior half of both surfaces distinctly barred with dusky, while in the brighter rusty colored *alascensis* the whole upper surface is quite uniform, *without any trace of bars*, having, besides, a still longer bill.*

The most interesting feature of the two species is perhaps, however, the fact that the young are even more widely distinct than the adults. The young of *alascensis* are of the same general bright rusty color as the adults, with the dusky edgings of the feathers on the lower surface very pale and indistinct, and the crown of the head is not differently colored from the back.

It might be thought impossible that the short-billed, dark-colored *fumigatus* with the very distinct blackish bars should ever have been confounded with the long-billed, bright-colored *alascensis*, which has no cross-bars whatever on the upper surface, but, nevertheless, we often see the latter quoted as a mere synonym of the former, and Taczanowski, in 1881, still maintains that *fumigatus* breeds yearly on the Aleutian Islands (J. f. Orn., 1881, p. 180). For completeness's sake I have therefore appended a second table of dimensions containing the measurements of specimens from the American Aleutians and from Alaska.

It may be stated here that, although I have examined a series of more than forty specimens, I failed to detect any individual presenting intermediate characters. The complete isolation of the habitats of the three forms make their intergradation, *a priori*, more than improbable.

In order to give a true idea of the general color of *pallescens* it may finally be said that it comes very near to pale specimens of *T. troglodytes* from Central Europe, from which it is distinguished by the pattern of the longest tertiary, the markings on the back, the indistinctness of the

* *Cf.* FINSCH, Abhandl. Nat. Ver. Bremen, III, 1872, p. 31, where he states the reverse. It is to be remarked, however, that his specimen, from Kodiak, is *T. pacificus* and NOT *T. alascensis*, as he determined it.

...pe, the well-defined light spots on the auriculars, &c., ... differences in the proportions; and from the barred ...tern Norway, which I have called *Troglodytes troglodytes* ...besides, distinguished by its duller color.

...nother place (Naturen, 1884, p. 34), made the statement ... *pallescens*, I had obtained a specimen of another *Trog-* ... I suspected might be *fumigatus*, referring to what is No. ... following list. My reason for so thinking was that the ...ently shaped from that of the other specimens which I had ... strongly curved at the tip. The other differences which I ...anish upon a close examination, and the curvature of the bill ...plained by the fact that the tip of the lower mandible is ... It certainly belongs to the species here in question.

List of specimens collected.

	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
				mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
944	Bering Island	Sept. 20, 1882	♂ ad.	114	.....	53	36	13	19
967	....do	Dec. 12, 1882	♂ ad.	118	.....	54	35	14	19
213	Copper Island	June 30, 1883	♂ ad.	115	25	52	35	14	19.5
214	....do	July 1, 1883	♂ ad.	117	23	52	34	13.7	18.3
	Average	.....	.....	116	24	52.7	35	13.7	18.7
703	Bering Island	Oct. 31, 1882	♀ ad.	106	.....	51	35	13	18
914	....do	Feb. 21, 1883	♀ ad.	114	.....	50	34	.....	19
915	....do	May 8, 1883	♀ ad.	113	.....	49	35	.....	19
204	Copper Island	June 28, 1883	♀ ad.	113	23	49	34	13	18.5
	Average	.....	.....	111.5	23	49.7	31.5	13	18.6
472	Copper Island	July —, 1882	jun.	.....	.....	51	35	13	19
229	....do	July 5, 1883	♀ juv.	104	16	48	29	11	18
230	....do	July 5, 1883	♂ juv.	106	7	50	28	9.7	18.5
234	....do	July 8, 1883	♂ juv.	116	18	51	32	10.5	19
273	....do	July 20, 1883	juv.	113	24	50	35	11	19.5
274	....do	July 20, 1883	♂ juv.	115	23	53	36	11.2	19.2
275	....do	July 20, 1883	♂ juv.	114	23	54	36	12	18.5
276	....do	July 20, 1883	♂ juv.	118	28	51	36	11	19
277	....do	July 20, 1883	♀ juv.	115	25	49	34	11.5	18.8
286	....do	July 23, 1883	juv.	121	24	52	37	12.7	19.5

904.—Iris dark brown. Bill blackish brown, at the base of lower mandible lighter, more grayish brownish gray, darker behind, more yellowish below the toes.

519.—Bill blackish brown, tomia, base of gonys, and angle of mouth yellowish. Feet light brown, joints darker.

No 92532.—Iris dark brown. Bill blackish brown, basal half of tomia and angle of mouth yellowish. Feet brownish gray. In the stomach remains of spiders and a land snail.

No. 92531.—Feet of a yellowish brownish flesh-color. Extremely fat.

No. 92521.—Feet light and clear grayish brown, joints darker. Not fat. A large naked "breeding patch" on abdomen and breast.

No. 92523.—Iris very dark brown. Bill dark grayish brown, lower mandible pale brownish flesh-color; angle of mouth prominent; bright neaple-yellow. Feet pale brownish gray.

No. 92528 belonged to the same family as Nos. 92523 and 92529.

Table of dimensions.

I.—TROGLODYTES FUMIGATUS TEMM.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	mm.	mm.	mm.
91363	Jouy	787	Tate Yama, Japan	Nov. 17, 1882	♂ ad.	50	37	10.7	17.7
91364	...do	828	.....do	Dec. 2, 1882	♂ ad.	51	35	11	17
91366	....do	835	.....do.....	Dec. 4, 1882	♂ ad.	49	36	11	18
			Average.....	.....	.....	50	36	10.9	17.6
91365	....do	834	Tate Yama, Japan	Dec. 4, 1882	♀ ad.	45	32	10.5	15.5
91367	....do	839	.....do.....	Dec. 4, 1882	♀ ad.	47	32	10	16.2
			Average.....	.....	.....	46	32	10.2	15.8
88640	.. do	571	Fuji, Japan	July 20, 1882	♂	49	33	10.8	18.5

II.—TROGLODYTES ALASCENSIS BAIRD.

61330	W.H.Dall.	.....	Unalashka, Alaska.....	Oct. 21, 1871	♂ ad.	51	34	15	20
61327	....do	94	Amaknak Island, Alaska	Oct. 22, 1871	♂ ad.	49	35	14	20
61635	....do	288	Iliuliuk, Alaska.....	Dec. 3, 1871	♂ ad.	49	32	13.5	19.5
68324	Adams	.....	Saint George's Island, Alaska.	.....	♂ ad.	51	36	14	19.5
73508	Nelson.....	.....	Akontan Island, Alaska	May 13, 1877	♂ ad.	52	33	15	19
78867	Turner ...	173	Alaska.....	.....	♂ ad.	49	32	14	19
78869	....do	175	.....do.....	.....	♂ ad.	51	33	15	18.5
78870	.. do	172	.....do.....	.....	♂ ad.	51	34	15.5	19
			Average	.....	.....	50.4	33.6	14.5	19.
78871	....do	174	Alaska.....	.....	♀ ad.	51	32	14	19.
61340	Bean.....	3897	Iliuliuk, Alaska.....	Oct. 13, 1880	♀ ad.	48	32	14	18.
						49.5	32	14	19

The natives of the Commander Islands used to call this species, peculiar to the islands, the "*Limaschinka*," which means a little "chew of tobacco," obviously in allusion to its color, size, and shape.

On Bering Island the Limaschinka is rather scarce, but it is said that it was a common bird along its rocky beaches not many years ago. It seems probable that the growing multitude of the red *Arvicola* is

ıe of the diminution. An argument in favor of this opinion ıct that the only place where the bird is still found in propor- bundance is on the small islet Toporkoff, where the *Arvicola* yet made its appearance, nor have its numbers diminished on Island, where it is still common, and where there are no field- disturb it.

eral manners of movement, flight, &c., it closely resembles the *T.* and *T. troglodytes*. It is, however, strictly confined to the rocks, ırly the steep rugged walls near the shore, and they are fre- met with among the large stones close to the water's line. s among the rocks in search of its food, and builds its nest s its young in a deep hole or crack, usually where the stone is athered and brittle, but always so that it is safe from anything ıan a mouse and which cannot fly. I knew of several holes in ıere were nests, but it was, in every case, quite impossible to ıem. Its voice is agreeable and vigorous, remarkably so c m- ith the size of the bird. Like that of *T. parvulus*, it has a great ınce to the song of the canary, but it differs from that of the n species in being of a somewhat higher and more metallic

eedless to remark that the bird is a resident on the island.

Family PARIDÆ.

132. Parus kamtschatkensis (BONAP.).

rus carbonarius PALL., Zoogr. Ross. As., I, p. 556 (*part*).
rus palustris PALL., Zoogr. Ross. As., I, p. 557 (*part*).
cila kamtschatkensis BONAP., Consp. Av., I, p. 230 (*nec* TACZAN., 1872, &c., *nec* SEEB., *nec* BLAKIST.).—KITTL., Denkw., I, p. 321 (*cf.* BOLLE, J. f. Orn., 1859, p. 47).—TACZAN., Bull. Soc. Zool. France, 1882, p. 390.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 361.—*Parus k.* MADARASZ, Zeitschr. Ges. Orn., I, 1884, p. 77, pl. iv.
rus wiemuthi DYBOWSKI, MSS.

ɔird is a most elegant and distinct species, as already remarked ıparte. It is rather strange that Taczanowski and others could ıe name *kamtschatkensis* to the northeastern form of *borealis*, as rte (*l. c.*) describes it as "*albo-canescens*," while Taczanowski him- es that his birds were "schiefer-aschgrau," slaty ash-colored. It ıroof more that it usually promotes more confusion to adopt an ame, the description of which does not exactly fit, than to give

a new name, which may later turn out to be a synonym. The *kamtschatkensis* of Taczanowski should stand as *Parus b* (SWINH.), Ann. Mag. Nat. Hist., 1871 (p. 257).†

Parus kamtschatkensis BP. is one of the most striking looki in the group of the Chickadees. Its light color looks almost pu when the lively fellow, busily engaged in the search for insec end of the green branches, flits from birch to birch, and the pre cap gives it a most exquisite appearance.

In spring and summer they were rather scarce, and, therefo pose them to breed only in the pine woods, but during my stay paulski, in September and October, I found them numerous i birch and elder groves of the surroundings. They were usuall small flocks of from four to ten individuals, rapidly passing thr woods, announcing their approach by the vigorous call-note t the troup managed to keep together. Whenever any of them t too deeply absorbed in the search for food or in a struggle w spider, and found himself left behind, he would sing out an anx inquiring *tæ, tæ*, which immediately was answered by one or his comrades with a similar but more rapidly uttered sound, hearing range, whereupon he, with a satisfied *tæ, tæ-æ-æ-æ-æ* hurry off to join them. In all the numerous flocks I met the was a single bird of a different kind.

No specimen of this bird has been obtained from the islan may sometimes be met with as a straggler from Kamtschat Cossak, Aleksander Selivanoff, on the 4th of May, 1883, informe in the neighborhood on the village on Bering Island he had see bird of the size of a Red-poll, but quite white, and with a bl While he was fetching his gun, in order to secure it for me, peared. It can hardly have been any other bird than the Ka kan Chickadee.

---

* Taczanowski writes *Pœcilia*, but *Pœcile* is the original spelling of Kaup *Pœcilia* is preoccupied in 1801 for a fish and in 1802 for a lepidopterous ins been unable to find any structural character which will separate these *Parus*.

† The synonymy would then be: *Pœcilia kamtschatkensis* TACZAN., J. f. p. 443 (*nec* Bp., *nec* BLAKIST., *quæ japonica*).—*Id.*, Orn. Fauna Vost. Sibi (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 163.—*Parus palustris* subsp *kensis* SEEB., Ibis, 1879, p. 32.—*Pœcilia borealis* ? TACZAN., Bull. Soc. Zo 1882, p. 392.

List of specimens collected.

	Locality.	When collected.	Sex.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.	Exposed culmen.
				mm.	*mm.*	*mm.*	*mm.*	*mm.*
0	Petropaulski, Kamtschatka	Sept. 19, 1883	♂	130	36	61	58	9
4	do	Sept. 27, 1883	♂	133	28	66	59	9
3	do	Oct. 2, 1883	♂	131	32	62	59	8
8	do	Oct. 6, 1883	♂	130	29	65	58	8
0	do	Sept. 19, 1883	♀	125	32	61	57	9
1	do	Sept. 19, 1883	♀	128	32	61	57	9
4	do	Sept. 20, 1883	♀	126	29	57	54	9
5	do	Sept. 20, 1883	♀	127	33	62	57	9
6	do	Sept. 20, 1883	♀	125	31	62	55	8
0	do	Sept. 29, 1883	♀	132	33	62	57	8
4	do	Sept. 30, 1883	♀	126	28	63	56	9
4	do	Oct. 2, 1883	♀	.....	.....	62	57	9
8	do	Oct. 9, 1883	♀	121	26	60	54	9
1	do	Oct. 10, 1883	♀	.....	.....	62	54	8
5	do	Sept. 20, 1883	.....	128	33	63	56	9
2	do	Oct. 2, 1883	.....	132	33	63	59	9
5	do	Oct. 2, 1883	....	.....	.....	61	58	9
9	do	Oct. 7, 1883	.....	131	33	62	59	8
0	do	Oct. 7, 1883	....	135	34	.....	.....	.....
1	do	Oct. 7, 1883	...	.....	.....	61	55	9
2	do	Oct. 7, 1883	.....	.....	.....	62	56	9
3	do	Oct. 7, 1883	.....	.....	.....	63	59	8
6	do	Oct. 7, 1883	.....	.....	.....	65	62	10

Family SYLVIDÆ.

133. Acrocephalus ochotensis (MIDD.).

ylvia (Locustella) ochotensis MIDDENDORF, Sibir. Reise, II, 2 (p. 185).—*Calamodyta o.* TACZAN., Bull. Soc. Zool. France, 1882, p. 387.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 358.

ylvia certhiola KITTLITZ, Denkw., II, p. 199 (*nec* PALL.).

Locustella subcerthiola SWINHOE, Ibis, 1874, p. 154.—DAVID. et OUST., Ois. Chine (p. 249) (1877).

Acrocephalus dybowskii STEJNEGER, Pr. U. S. Nat. Mus., VI, 1883, p. 92.—*Id.*, Naturen, 1882, p. 181.

additional material I collected since submitting my preliminary gives little need for further comment. All the additional speci- were taken during early summer. The female (No. 92559) is the one, with a decided cinereous tinge on the nape, corresponding with the male described by Mr. Taczanowski (*l. c.*).

h the same author I agree in his opposition to including this spe- the genus *Locustella*.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm.
89151	1251	Petropaulski	July 5, 1882	♂ ad.	149	.....	70	57
92559	2184	Bering Island	June 21, 1883	♀ ad.	152	34	57	52
92560	2329	.....do	June 28, 1883	(♂) ad	.....	.....	70	56
92558	2331	.....do	July 13, 1883	(♂) ad.	.....	.....	69	56
92561	2387	Petropaulski	July —, 1883	ad.	.....	.....	70	56

No. 89151.—The type of *Acrocephalus dybowskii* STEJNEGER. Iris hazel. Feet clear yellowish brown.

No. 92559.—Iris brown Bill horny, blackish brown; basal half of lower mandible light gray, towards base yellowish, as is also the angle of mouth. Feet clear grayish brown, on the inner side tinged with yellowish; toes below yellow. Eggs swollen.

Of this bird which was rather numerous in the vicinity of Petropaulski, I have already given an account in my "Contributions," &c., Pr. U. S. Nat. Mus., 1883, p. 92, which need not be repeated here.

On the 21st of June I obtained a female on Bering Island. It was shot among the high grass near the beach, between Severnaja Seal-rookery and Saranna, and was in company with two others of its kind. Two others were shot and prepared on Bering Island, when I was absent on a trip to Copper Island. They were both said to be males. It is only an occasional visitor to the island.

134. Locustella hendersonii (CASS.).

1858.—*Sylvia locustella* KITTL., Denkw., II, p. 198 (*nec* LATH.).

1858.—*Lusciniopsis hendersonii* CASSIN, Proc. Phila. Acad., 1858, p. 194.—*Locustella hendersonii* SWINH., Ibis, 1863, p. 444.

1863.—? *Locustella minuta* SWINH., P. Z. S., 1863, p. 93.

1875.—*Locustella lanceolata* SWINH., Ibis, 1875, p. 449.—SEEBOHM, Ibis, 1879, p. 36.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 222.—*Id.*, *ibid.*, X, 1882, p. 158.—STEJNEGER, Naturen, 1882, p. 183.—TACZAN., Bull. Soc. Zool. France, 1882, p. 388.—DYBOWSKI, Bull. Soc. Zool. France, 1883, p. 358.—BLAKIST., Amend. List B. Jap., p. 22 (1884).

Seebohm (Brit. Mus. Cat., V, p. 119) describes the under wing-coverts and the axillaries as "pale chestnut." In my bird there is not a trace of such a color; in fact these feathers are of a pale buffish white. They agree much better with Cassin's description, where they are stated to have "a tinge of a very pale reddish." I have examined Cassin's type in the collection of the Philadelphia Academy, and found it

o agree perfectly with my birds, which I consider sufficiently distinct rom their western representative.

It was, as I thought, under rather peculiar circumstances that I nade the first acquaintance of the Grasshopper-warbler. From what I ad read about the habits of allied species, and conjectured from the nanners of *Acrocephalus ochotensis*, I listened for this bird about and fter sunset, wherever willows were abundant, in the marshy valley ottoms. I recollected the many poetical accounts of ornithological en-husiasts waiting in the wet swamps for the moon's rising over the hite vapors, when the males of *Locustella nævia* would commence their trange chirping, and, invisible to the bewitched naturalist, mock round him like mischievous elves, now pitching their ventriloquous notes to the left, now to the right, until the gunning poet in bewilderment and despair sends a shot at random in the direction from whence the creaking thrills seem to proceed. So I tried patiently to get enchanted, bewildered, water-soaked, and mosquito-bitten too; but no *Locustella!*

It was a very hot day in the summer of 1882, in fact, the last day of June, that I took an ornithological morning ramble to a broad valley just behind the rounded hills, upon the sloping base of which Petropaulski is situated. The weather had been dry and warm for a considerable time; the vegetation was longing for rain, and the soil was gray and dusty. At last I determined to return, when the tropical rays of the sun at noon had silenced all birds, and the only living being in the neighborhood not seeking the cool shade was the mosquito-phobeous naturalist. Suddenly I was struck by the vigorous and rather protracted chirp of a heat-despising cricket. Something in its note led me to wish to get hold of the producer, so I cautiously proceeded in the direction of the sound. Zirrrrr.....! But who describes my astonishment when I found that the supposed cicada was a small bird facing the sun from the top of a broken and dead birch! As he did not mind the noise I made, when breaking my way through the five-feet-high grass, if I only took care to stop whenever he interrupted his curious love-song, his fate was soon sealed. It is needless to say that I now became an attentive listener to the grating sound of the locusts, and half an hour later I was rewarded by another male, which I shot from the outer branches of a leaf-clad *Betula ermani*.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	mm.	mm.
89159	1240	Petropauloki	June 30, 1882	♂ ad.	125	56	.....
89160	1241	.....do	June 30, 1882	♂ ad.	120	58	46

No. 89159.—Iris dark hazel. Bill blackish brown; lower mandible brownish flesh-color. Feet flesh-color; toes above brownish; below yellowish.

No. 89160.—Iris, bill, and feet as foregoing.

135. Phyllopseustes borealis (BLAS.).

1826.—*Motacilla trochilus* PALL., Zoogr. Ross. Asiat., I, p. 494 (*part, nec* LIN.).

1853.—*Sylvia* (*Phyllopneuste*) *eversmanni* MIDD., Sibir. Reise, I, 2, (p. 178, tb. xvi, fig. 1-3) (*nec* BONAP.).—RADDE, Reisen Süden Ost-Sibir., II (p. 263) (1863).—DYBOW. & PARVEX, J. f. Orn., 1868, p. 334.—NELSON, Cruise Corwin, p. 60 (1883).

1858.—*Phyllopneuste borealis* BLASIUS, Naumannia, 1858, p. 313.—*Id.*, Ibis, 1862, p. 68.—SWINHOE, P. Z. S., 1871, p. 356.—TRISTRAM, Ibis, 1871, p. 231.—TACZAN., J. f. Orn., 1872, p. 358.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, 1875, p. 245.—*Id.*, Bull. Soc. Zool. France, 1876, p. 141.—*Id.*, *ibid.*, 1882, p. 388.—*Id.*, Ois. Fauna Vost. Sibir., p. 26 (1877).—BAIRD, BREW. & RIDGW., B. N. Amer., I, p. 70 (1874).—DAVID & OUSTAL., Ois. Chine (p. 271) (1877).—STEJNEGER, Naturen, 1882, p. 182.—*Id.*, Pr. U. S. Nat. Mus., 1883, p. 71.—*Phylloscopus* SEEB., Ibis, 1879, pp. 9 and 36.—BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 223.—*Id.*, *ibid.*, X, 1882, p. 159.—NELSON, Cruise Corwin, p. 60 (1883).—BLAKIST., Amend. List B. Jap., p. 56 (1884).—*Sylvia b.* PALM, Cat. Fish. Exp., Lond. Swed., p. 204.

1858.—*Sylvia chloris* KITTLITZ, Denkw., I, p. 314, and II, p. 200.

1860.—*Phylloscopus sylvicultrix* SWINH., Ibis, 1860, p. 53.—*Id.*, *ibid.*, 1866, p. 295.—*Phyllopneuste s.*, *Id.*, *ibid.*, 1863, p. 307.—*Id.*, P. Z. S., 1863, p. 295.

1869.—*Phyllopneuste kennicotti* BAIRD, Trans. Chic. Acad., 1869, I, 2 (p. 313), pl. xxxi, fig. 2.

1872.—*Phyllopneuste magnirostris* FINSCH, Abh. Nat. Ver. Bremen, III, p. 32 (*nec* BLYTH).

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Exposed portion of first primary.	Tail-feathers.	Exposed culmen.	Tarsus.
					mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
81993	1164	Bering Island	June 9, 1882	♂ ad.	124	.....	67	10	49	10	20
81957	1252	Petropaulski	July 6, 1882	♂ ad.	127	.....	69	8	49	10	21
81958	1245	.....do	July 4, 1882	♂ ad.	134	.....	72	13	54	10	20
81959	1215	Copper Island	June 20, 1882	♂ ad.	130	.....	69	11	48	10	21
82551	2141	Bering Island	June 8, 1883	♂ ad.	129	24	64	10	48	10	21
82552	2148	.....do	June 9, 1883	♂ ad.	134	34	68	10	48	10	21
82553	2173	.....do	June 15, 1883	♂ ad.	139	25	72	9	51	11	21
82555	2174	.....do	June 15, 1883	♂ ad.	140	24	72	11	50	10	20
82554	2179	.....do	June 17, 1883	♂ ad.	131	25	66	10	47	10	20
82556	2182	.... do	June 19, 1883	♂ ad.	133	23	70	11	49	10	20
82560	2639	Petropaulski	Sept. 25, 1883	♂	132	21	67	11	49	9	20
		Average measurements of eleven males			132	25	69	10	49	10	20

No. 81993.—Iris dark brown. Bill horny brown, tomia and base of lower mandible yellowish; angle of mouth chrome yellow. Feet dark grayish brown, toes below yellow.

No. 82551.—Testes large, swollen.

No. 82552.—Feet clear yellowish brown.

No. 82556.—Iris dark brown. Bill above horny brown, below and at base orange-yellow. Feet brownish gray, tarsus behind and toes below yellow.

The above specimens have been carefully compared with a series from Alaska and another from China. But as both are too imperfectly labeled by the collectors, nothing definite can be said. Both series show inferior dimensions, which may be ascribed to the occurrence of females, while the Kamtschatkan series unfortunately only includes males. But it would seem as if the Alaskan birds have a comparatively smaller bill and smaller size altogether, and I should not be surprised if a larger and better determined series of specimens from Alaska would prove them entitled to rank as a subspecies under the name of *Ph. borealis kennicotti* (BAIRD). The case is absolutely parallel to that of *Budytes flavus leucostriatus*, offering the same suggestions as to the migratory route of the Alaskan birds.

Tables of dimensions.

A.—SPECIMENS FROM ALASKA.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Wing.	Exposed portion of first primary.	Tail-feathers.	Exposed culmen.	Tarsus.
						mm.	mm.	mm.	mm.	mm.
45909*	Pease	178	Saint Michael's, Alaska.	Aug. 16, 1866	.....	60	9	43	9	20
75416	Nelson	438	....do	Aug. 24, 1877	.....	60	7	42	9	20
75415	....do	462	... do	Aug. 31, 1877	♂ ..	63	9	46	8	20
	Average measurements of three adults					62	8	44	9	20
75417	Nelson	463	Saint Michael's, Alaska.	Aug. 31, 1877	juv.	59	10	41	8.5	18

B.—SPECIMENS FROM CHINA.

86088	Jouy & Dale.	147	Hong-Kong	Sept. 25, 1881	.....	64	11	47	11	20
86092	....do	152	Kowloon, China	Sept. 28, 1881	♀ad.	63	10	41	9.5	20
86110	... do	173	Hong-Kong	Oct. 9, 1881	.....	64	11	45	10	20
88504	Swinhoe	(!)	Amoy, China	.....	.....	66	7	46	11	19
88505	.. do	.....	....do	May —, 1866	.....	18	9	46	9.5	20
	Average measurements of five specimens					65	10	45	10	20

* Type of *Ph. kennicotti* BAIRD. † Labeled *Phyllopneuste sylvicultrix.*

The Arctic Willow-warbler is one of the commonest summer birds in the neighboring birch and elder groves of Petropaulski.

They are not known to breed on the islands, where they have been collected only during the spring migration. In 1882 I shot only one specimen on each island, but during the "bird-wave" of 1883, they were plentiful in the northern part of Bering Island.

The birds occurring on the islands belong to the same stock as those inhabiting the mainland of Kamtschatka. As already mentioned, the individuals from Alaska seem to travel on a route not touching Kamtschatka.

136. Phyllopseustes xanthodryas (SWINH.).

1863.— *Phylloscopus xanthodryas* SWINHOE, P. Z. S., 1863, p. 296.— SEEBOHM, Ibis, 1[illegible] p. 71.— BLAKIST. & PRYER, Trans. As. Soc. Japan, VIII, 1880, p. 223.— *ibid.*, X, 1882, p. 159.— JOUY, Pr. U. S. Nat. Mus., 1883, p. 283.— BLAKE Amend. List B. Jap., p. 16 (1884).— *Phyllopneuste x.* SWINH., P. Z. S., 1[illegible] p. 356.— DAVID & OUST., Ois. Chine (p. 268) (1871).

This species is said to be distinguished from *Ph. borealis* in hav[illegible] e underparts more yellowish, a larger size, and a longer first [illegible]

mary. The latter two distinctions are formulated by Seebohm (Cat. Brit. Mus., V, p. 38) thus: "Exposed portion of bastard primary 0.3 to 0.35 inch [7.6 to 8.9mm] in adults; 0.4 to 0.45 [10 to 11.4mm] in birds of the year" in *borealis*, against "0.5 to 0.6 inch" [12.7 to 15.2mm] in *xanthodryas*, and "length of wing 2.7 to 2.4 inches" [69 to 61mm] in *borealis*, against "2.85 to 2.6 inches" [72 to 66mm] in *xanthodryas*.

Comparing these measurements with those of *borealis* given by me in the table under the head of the latter species, it is evident that the individual variation, even in the same sex, is as great as the difference between the maximum of the larger and the minimum of the smaller species, as given by Seebohm. It will furthermore be seen that the average measurements of the first primary in my series is equivalent to the minimum length of the corresponding feather of the young bird, as stated by Seebohm, and that only one or two, out of eleven, have a bastard primary as small as the maximum given by the latter author. It is therefore evident that, for instance, No. 89158, in regard to the dimensions, should rank as *Ph. xanthodryas*. It agrees, however, so closely with the others of the same series in color that there can be no thought of separating it from these.

Below are given the dimensions of two genuine *Ph. xanthodryas* collected by Mr. Jouy in Japan, one a bird in summer plumage, the other one shot in the autumn. They are both males, as are all my specimens of *borealis*. A comparison of their dimensions gives the same results as above; they differ in no way, the largest of the two being even a trifle smaller than the largest *borealis*. The first primary is, however, in both, longer than the average of *borealis*, although in the smaller specimen it is a little shorter than the longest first primary in *borealis*. But the color is decidedly much more yellowish than in the eleven specimens belonging to the latter species.

It may here be well to remark that not only are the two Japanese specimens completely uniform in color *inter se*, but there is not the slightest difference between the specimen No. 92556 of *borealis* in autumnal plumage and the other ten obtained during the spring and summer months.*

Finally it may be stated that there is no difference in color whatever

* That the relative length of the second and sixth primaries is of little value is evident from the fact that in No. 75416 from Alaska the sixth is longer than the second.

between the two Japanese specimens and No. 92557 * shot at Petropaulski on the last day of September, 1883, the dimensions of which are given below. It is superior in size to the smaller of the Japanese birds, while its color is of exactly the same yellowish shade, and the length of the first primary is considerably [2.6mm] greater than the maximum length of the same portion of the quill in the young *borealis*.

My reasons for referring this single specimen to the Japanese species may be clearly seen from the above statements without further comment. But the question presents itself whether there is no intergradation between the two forms. The dimensions certainly intergrade, but not having seen or heard of intermediately colored forms I abstain from naming the present bird *Ph. borealis xanthodryas*.

Dimensions of the specimen collected.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Age.	Total length.	Tail beyond wings.	Wing	Exposed portion of first primary.	Tail-feathers.
						mm.	mm.	mm.	mm.	mm.
92557	Stejneger	2722	Petropaulski	Sept. 30, 1883	ad.	132	24	67	14	45

Table of dimensions of specimens from Japan.

U. S. Nat. Mus. No.	Collector's name.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Exposed portion of first primary.
						mm.	mm.	mm.	mm.
88624	Jouy	573	Fuji, Japan	July 20, 1882	♂ ad.	.....	.....	71	15
91374	do	682	Japan	Oct. 3, 1882	♂ ad.	.....	.....	65	12

Only one specimen was obtained in the neighborhood of Petropaulski, the species thus presumably being scarce. It was the last Wilson's warbler I saw during the autumn of 1883.

* The yellow color of these birds is of a very different tint from that of the young *borealis*, being of a clear yellow, suffused with greenish, while in the latter they is duller and tinged with buff. It may perhaps not be unnecessary to state that 92557 is not a bird of the year.

Family TURDIDÆ.

137. Turdus eunomus TEMM.

1826.—*Turdus fuscatus* PALL., Zoogr. Ross. As., I, p. 451, tab. xii (*nec* VIEILL., 1807).—MIDD., Sibir. Reise Zool., I, 2 (p. 172) (1853).—SCHRENCK, Reise Amurl., I, p. 354 (1860).—SWINH., P. Z. S., 1862 (p. 317).—*Id.*, *ibid.*, 1863, p. 280.—*Id.*, *ibid.*, 1871, p. 366.—*Id.*, Ibis, 1863, I, pp. 93, 277.—*Id.*, *ibid.*, 1874, p. 157.—BLAKIST., Ibis, 1862, p. 319.—*Id.*, Amend. List B. Jap., p. 17 (1884).—BLAKIST. & PRYER, Ibis, 1878, p. 241.—*Id.*, Trans. As. Soc. Japan, VIII, 1880, p. 227.—*Id.*, *ibid.*, 1882, p. 167.—RADDE, Reisen Süd. Ost-Sibir. (p. 236) (1863).—PRZEWALSKI, Putesch. Ussur. Suppl. (n. 96) (1870).—FINSCH, Verh. Zool. Botan. Ges. Wien, 1872, p. 257.—TACZANOWSKI, J. f. Orn., 1872, p. 457.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, *ibid.*, 1875, p. 246.—*Id.*, *ibid.*, 1876, p. 193.—*Id.*, Bull. Soc. Zool. France, 1876 (p. 147).—*Id.*, *ibid.*, 1882, p. 388.—*Id.*, Orn. Fauna Vost. Sibir., p. 31 (1877).—HEUGLIN, J. f. Orn., 1874, p. 397.—BOLAU, J. f. Orn., 1880, p. 121.—*Id.*, *ibid.*, 1881, p. 56.—*Id.*, *ibid.*, 1882, p. 334.—JOUY, Pr. U. S. Nat. Mus., 1883, p. 279.

1831.—*Turdus eunomus* TEMM., Pl. Color., II, 87 livr., pl. 514.—DYBOWSKI & PARVEX, J. f. Orn., 1868, p. 333.

1877.—*Turdus dubius* DRESSER, Birds of Eur., (pt. lviii).—SEEBOHM, Ibis, 1879, p. 3.

A single specimen of this handsome Thrush was obtained on Bering Island between the sand-dunes opposite the village on the 3d of June, 1883. It is only a rare straggler from Kamtschatka.

At Petropaulski I met a small flock of this species May 15, 1883, and shot, but only wounded, one.

Specimen collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*	*mm.*
[illegible]*	2119	Bering Island	June 3, 1883	♀ ad.	244	50	123	86

*Iris dark brown. Bill horny black, except the basal three-fourths of upper tomium and lower mandible, except tip, pale orange. Feet pale grayish brown. Very fat. Stomach contained remains of *Staphylinidæ*.

138. Turdus obscurus GMEL.

1788.—*Turdus obscurus* GMEL., Syst. Nat., I, 2, p. 816.—MIDD., Sibir. Reise, I, 2 (p. 169) (1853).—RADDE, Reis. Süd. Ost-Sib. (p. 235) (1863).—DYB. & PARV., J. f. Orn., 1868, p. 333.—SWINH., P. Z. S., 1871, p. 367.—*Id.*, Ibis, 1874, p. 443.—TACZAN., J. f. Orn., 1872, p. 440.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, *ibid.*, 1875, p. 246.—*Id.*, *ibid.*, 1876, p. 193.—*Id.*, *ibid.*, 1881, p. 182.—*Id.*, Bull. Soc. Zool. Fr. 1876, p. 148.—*Id.*, *ibid.*, 1882, p. 388.—*Id.*, Orn. Fauna Vost. Sibir., p. 32 (1877).—DAV. & OUST., Ois. Chine (p. 153) (1877).—SEEB., Ibis, 1879, p. 4.—BLAK. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 227.—*Id.*, *ibid.*, X, 1882, p. 165.—JOUY, Pr. U. S. Nat. Mus., 1883, p. 277 (*part*).—BLAK., Amend. List B. Jap., p. 59 (1884).

1826.—*Turdus pallens* PALL., Zoogr. R. As., I, p. 457.—TEMM. & SCHL., F. Jap., Av. (p. 63, pl. xxvii) (1847).—KITTL., Denkw., II, p. 234 (1858).—SWINH., Ibis, 1860, p. 56.

As a whole, my specimens are considerably paler than a series of birds from Japan, collected by Mr. Jouy. Since the latter are autumnal specimens in fresh plumage, the difference may only be seasonal, however.

The coloration is very much the same in all the specimens, except in No. 92511, which is much brighter and deeper tinged, both above and underneath, than any of the others.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm.
92511	2149	Bering Island	June 10, 1883	♂ ad.	215	41	121	81
92513	2159	....do....	June 11, 1883	♂ ad.	228	40	125	86
92509	2170	....do....	June 13, 1883	♀ ad.	226	38	119	79
92508	2175	....do....	June 13, 1883	♀ ad.	227	40	120	82
92510	2176	....do....	June 15, 1883	♀ ad.	221	33	124	78
92512	2181	....do....	June 17, 1883	♀ ad.	228	32	126	83

No. 92513.—Iris dark brown. Bill horny blackish brown; lower mandible, except tip, which is dusky. tomia, and angle of mouth pale orange-yellow. Naked eye-ring and lower eyelash light yellowish gray. Feet, including claws, clear yellowish gray.

Nos. 92508, 92509, 92510.—Very fat. Eggs small, undeveloped.

No. 92512.—Feet more yellow than any of the foregoing.

A few individuals of this Thrush usually visit Bering Island in the spring, without any regularity, however. In 1883 the first was observed on one of the first days of June, and during the week between the 10th and the 17th of the same month, two males and four females were secured. They were extremely shy, and always single.

139. Ianthia* cyanura (Pall.).

1776.—*Motacilla cyanurus* Pall., Reisen Russ. Reichs, II (app., p. 709).—*Id.*, Zoo[illegible] Ross. As., I, p. 490 (1826).—*Lusciola c.* Temm. & Schleg., Fn., Jap. Av. (p[illegible] pl. 21) (1847).—*L.* (*Nemura*) *c.* Schrenck, Reise Amurl., II, p. 361 (1860[illegible] *Sylvia* (*Nemura*) *c.* Midd., Sibir. Reise, II, 2 (p. 177, tb. 15, f. 5) (1853[illegible] Radde, Reis. Süd. Ost-Sibir., II (p. 258) (1863).—*Nemura c.* Blakist., I[illegible] 1862, p. 318.—Dybow. & Parvex, J. f. Orn., 1868, p. 334.—Przew., Pute[illegible] Ussur. (n. 53) (1870).—Taczan., J. f. Orn., 1872, p. 364.—*Id.*, *ibid.*, 1874 [illegible] 335.—*Id.*, *ibid.*, 1875, p. 246.—*Id.*, *ibid.*, 1876, p. 193.—*Id.*, Orn. Fauna V[illegible] Sibir., p. 27 (1877).—Bolau, J. f. Orn., 1880, p. 117.—*Id.*, *ibid.*, 1881, p. 5[illegible] Stejneger, Naturen, 1882, p. 180.—*Ianthia c.* Swinh., Ibis, 1863, pp[illegible] 298.—*Id.*, P. Z. S., 1863, p. 290.—*Id.*, *ibid.*, 1871, p. 359.—Whitely, Ibis, [illegible] p. 197.—David & Oust., Ois. Chine (p. 231, pl. 28) (1877).—Blakist[illegible] Pryer, Ibis, 1878, p. 239.—*Id.*, *ibid.*, Trans. As. Soc. Japan, VIII, 188[illegible] 224.—*I.* (*Nemura*) *c. Iid.*, *ibid.*, X, 1882, p. 161.—*Tarsiger c.* Jouy, Pr. U[illegible] Nat. Mus., 1883, p. 281.—Blakist., Amend. List B. Jap., p. 58 (1884).

* *Nemura*, *Nemoura*, and *Nematura* are all preoccupied in zoology and are therefore inapplicable. The propriety of uniting the type of *Ianthia* and its nearest allies with the forms comprising the genus *Tarsiger* seems rather doubtful to me.

1860.—*Nemura rufilata* SWINH., Ibis, 1860, p. 54 (*nec* HODGS.).—*Ianthia r. Id., ibid.*, 1861, p. 1861, p. 329.—*Id., ibid.*, 1862, pp. 261, 264.—*Id.*, P. Z. S., 1862, p. 316.

One of the rarest stragglers which the "bird-wave" forced over to the inhospitable shores of Bering Island was a specimen of this delicately-built and exquisitely-colored species. It was secured during my absence in Petropaulski and prepared by my faithful native assistant, Nikanor, or "the professor," as he was usually styled. The determination of the sex (by dissection) and the measurement of the total length were also made by him.

Even in Kamtschatka the Bluestart is a rare bird, and I believe that this is the first record of it having been taken there. One hot day in July, 1882, when seeking the shades of the birches on the hillock opposite Petropaulski, I met a splendid male of this lovely bird, the only one I have ever seen alive. I had just laid down for a moment's rest in the dense grove when he perched on a branch right over my head, wagging his sky-blue tail rapidly up and down. I did not dare wait until I could get a longer shot, for if he took to the wing he would have been gone forever. So, feverish with excitement, I lifted my gun, but aimed nevertheless too well. When at last I found the mutilated body, literally without head and tail, I could have cried at my misfortune but for the hope that another might soon get within range of my cane-gun. But the other did not come, and the chirping titlarks found me on several succeeding days posted in vain at the same spot. The remains, however, were sufficient for identification.

Dimensions of specimen collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Sex and age.	Total length.	Wing.	Tail-feathers.
					mm.	*mm.*	*mm.*
92518	2070	Bering Island	May 21, 1883	(♂) ad.	(123)	72	59

140. Melodes calliope (PALL.).

1776.—*Motacilla calliope* PALL., Reise Russ. Reich., III (p. 697).—*Lusciola c.* TEMM. & SCHLEG., Fann. Jap. Aves (p. 57) (1847).—*Sylvia c.* KITTL., Denkw., I, p. 314, II, p. 199 (1858).—*Melodes c.* BLASIUS, List B. Eur., p. 10 (1862).—*Erithacus c.* BLAKIST., Amend. List B. Jap., p. 58 (1884).

1788.—*Turdus camtschatkensis* GMEL., Syst. Nat., I, 2, p. 817.—*Sylvia* (*Calliope*) *kamtschatkensis* MIDD., Sibir. Reise, II, 2 (p. 174) (1853).—*Luscinia* (*C.*) *k.* SCHRENCK, Reise Amurl., I, p. 359 (1860).—*Calliope camtschatkensis* SWINH., P. Z. S., 1871, p. 359.—TACZAN., J. f. Orn., 1872, p. 433.—*Id.*, *ibid.*, 1874, p. 335.—*Id.*, *ibid.*, 1876, p. 193.—*Id.*, *ibid.*, 1881, p. 181.—*Id.*, Orn. Fauna Vost. Sibir., p. 27 (1877).—*Id.*, Bull. Soc. Zool. France, 1876, p. 143.—*Id.*, *ibid.*, 1880, p. 136.—*Id.*, *ibid.*, 1882, p. 388.—DAVID & OUST., Ois. Chine (p. 235) (1877).—BLAKIST. & PRYER, Ibis, 1878, p. 239.—*Id.*, Trans. As. Soc. Jap., VIII, 1880, p. 225.—*Id.*, *ibid.*, X, 1882, p. 161.—STEJNEGER, Naturen, 1882, p. 181.—*Id.*, *ibid.*, 1884, p. 6.

Kamtschatka's Nightingale, one of the loveliest birds I ever saw or heard, breeds plentifully round Petropaulski, especially in the sunny alder-groves on the slopes above and behind the town. In the late spring of 1883 I shot the first male arrivals on the 22d of May. It was absolutely silent, creeping shyly among the lower branches of the bushes. During the following autumn I met several in the latter part of September. They were found especially in a narrow valley on the eastern side of the graveyard, the same place where Kittlitz, more than fifty years ago, had collected his specimens during the same season of the year. About the 1st of October all had left.

A single straggler was shot on Bering Island January 29, 1883. It has the throat and chin white, with some mottlings of the lovely scarlet, which adorns these parts in the adult male. On the island it is only an accidental visitor.

List of specimens collected.

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Age and sex.	Total length.	Tail beyond wings.	Wing.	Tail-feathers.
					mm.	mm.	mm.	mm.
89155	1232	Petropaulski	June 27, 1882	♂ ad.	167	.....	79	63
89156	1236	.....do	June 29, 1882	♂ ad.	175	.....	79	64
92514	2050	.....do	May 22, 1883	♂ ad.	172	45	.....	.....
92517	2330	Bering Island	June 29, 1883	♂ ad.	.....	.....	76	57
92515	2306	Petropaulski	July —, 1883	ad.	.....	.....	77	65
92516	2593	.....do	Sept. 18, 1883	♂	170	38	78	62
	2642	.....do	Sept. 25, 1883	♂	164	34	.....	.....

No. 89155.—Iris dark brown. Bill brownish black. Feet grayish brown, hind part of tarsus shining whitish.

No. 89156.—As foregoing. Inside of mouth blackish brown.

No. 92514.—Iris dark brown. Bill horny grayish black. Feet dark pearl gray, below lighter with a livid tinge. Inside of mouth blackish. Testes large, swollen, dark olive gray.

No. 92516.—Bill horny blackish brown, paler at base of lower mandible; angle of mouth pale yellow; interior of mouth pale orange. Feet of a dark silvery gray with a brownish violet tinge, and tarsus white behind. Testes small, black.

No. 2642.—Bill horny blackish brown, pale flesh-color at base of lower mandible. Otherwise like the foregoing.

II.—SYNOPSIS OF THE BIRDS REPORTED TO INHABIT KAMTSCHATKA.

SYNOPSIS OF THE BIRDS REPORTED TO INHABIT KAMTSCHATKA.

The chief sources of our knowledge of the Kamtschatkan ornis are the explorations of Steller, Vossnessenski, v. Kittlitz, Dybowski, and myself, but the localities from which reliable information has been gathered are very few and limited, considering the area of the country, the greater part of which is still a *terra incognita*. We know next to nothing about the distribution of the species all along the western coast, and absolutely nothing about the birds on the eastern side north of Nischnij Kamtschatka. We know very little, if anything, about the relations of the two coasts of the peninsula *inter se*; we do not know much more about the birds of the mountains and their vertical distribution; and we are ignorant of the northern limits of most of the species.

The following list, therefore, only attempts to enumerate the species which have been recorded from Kamtschatka (including the Commander Islands) without going into details. The figures in parenthesis following the name refers to the page of this volume where the references belonging to the species will be found. The other species are provided with the necessary references.

A few names, more or less generally credited to Kamtschatka without there being any reliable authority for the statements, are given without a number.

COLYMBOIDEÆ.

1. **Colymbus holbœllii** (REINH.) (p. 11).
2. **Colymbus auritus** (LIN.) (p. 14).

ALCOIDEÆ.

3. **Urinator adamsii** (GRAY) (p. 14).

   Whether *U. imber* also occurs is doubtful, but not improbable.

4. **Urinator arcticus** (LIN.).

   Colymbus arcticus KITTL., Denkw., I, p. 330.—TACZAN., B. S. Z. F., 1882, p. 398.

5. **Urinator lumme** (GUNN.) (p. 15).

6. **Uria lomvia arra** (PALL.) (p. 17).

7. **Uria troile californica** (BRYANT) (p. 20).

Cepphus mandtii (LICHT.).

Schlegel (Mus. P. B. Urinat., p. 19) enumerates as No. 5 of *Alca grylle* an "Individu au plumage parfait, *et au miroir d'un blanc pur*; mais au ventre varié d'un petit nombre de plumes blanches, restes du plumage d'hiver, Kamtschatka, 1868." There can be no doubt that this specimen is referable to *mandtii*, which, consequently, sometimes comes as far down as Kamtschatka, provided the locality be correct.

8. **Cepphus columba** PALL. (p. 21).

9. **Cepphus carbo** PALL. (p. 21).

10. **Brachyramphus marmoratus** (GM.).

TACZAN., B. S. Z. F., 1883, p. 345.

11. **Brachyrampus kittlitzii** BRANDT.

The original specimens came from Petropaulski (Brandt, Mel. Biol., VII, p. 215).

Taczanowski (*l. c.*) mentions two specimens of a *Brachyramphus* obtained in Kamtschatka by Dr. Dybowski as different from *marmoratus*, without determining the species. They probably belong here.

12. **Synthliboramphus antiquus** (GM.) (p. 23).

Ptychoramphus aleuticus (PALL.).

According to Lichtenstein's "Nomenclator Avium Musei Berolinensis" (1854), p. 105, the collection of the Berlin Museum contains a single specimen from "Kamtschatka." The locality needs confirmation, however.

13. **Simorhynchus pygmæus** (GM.) (p. 23).

14. **Simorhynchus cristatellus** (PALL.) (p. 32).

15. **Simorhynchus pusillus** (PALL.) (p. 35).

16. **Cerorhinca monocerata** (PALL.).

Chimerina cornuta DYBOW., Orn. Centrbl., 1882, p. 28.

17. **Cyclorhynchus pstittaculus** (PALL.) (p. 38).

18. **Lunda cirrhata** PALL. (p. 43).

19. **Fratercula corniculata** (NAUM.) (p. 59).

LAROIDEÆ.

20. **Larus glaucescens** NAUM. (p. 62).

21. **Larus glaucus** BRÜNN.

TACZAN., B. S. Z. F., 1883, p. 341.

22. **Larus schistisagus** STEJN. (p. 67).

This is, in all probability, the bird which Taczanowski has recorded as "Larus pelagicus Bruch," a name which belongs to *L. dominicanus* as a synonym. It is also probably the same which Schlegel records from Kamtschatka as *L. occidentalis*, and Finsch (Ibis, 1879, p. 111), as *L. affinis*.

?**Larus borealis** BRANDT.

TACZAN., B. S. Z. F., 1882, p. 397.

"Des Oiseaux et des œufs de l'île Behring." Probably *L. glaucescens* is meant; or else it is *L. cachinnans* with an erroneous locality, for this latter species does not breed on Bering Island.

23. **Larus cachinnans** PALL.

At the entrance to Avatcha Bay I observed a number of these birds during the latter part of September, 1883.

24. **Larus kamtschatchensis** (BP.) (p. 73).

25. **Larus canus** LIN. (p. 76).

26. **Larus ridibundus** LIN. (p. 76).

Rhodostethia rosea (MACGILL.).

Two specimens in immature plumage are in the museum of Mayence, said to have come from Kamtschatka.

Mr. Howard Saunders gives a detailed account of them in the Ibis for 1875, pp. 484–487, but doubts the correctness of the statement as to the locality, as follows:

"The history of these specimens is not very satisfactory. They were purchased some years ago from the Maison Verreaux, and were stated to have come from Kamtschatka. When the late M. Jules Verreaux was staying with me, in 1870, I had a good deal of conversation with him about Laridæ and the Bürch collection, and I remember his expatiating upon the beauty, and especially the lovely rose-tint, of two specimens which he had sent to the Mayence Museum; he also persisted that they really did come from Kamtschatka, and that he had them from a Pole who had been there. It was impossible to contradict him; but for various reasons, upon which I need not enlarge, I was skeptical as to the locality, and continue to be so. It is true that another Arctic species (*Xema sabinii*) has been found breeding in both continents; but then its range can be traced from Greenland right across the American continent, and it is quite natural that it should pass into Siberia; whereas the Americans, with all their energy and research, have hitherto failed to acquire a single specimen of *Rhodostethia rosea*, either in their own Alaska possessions or in those portions of Kamtschatka visited by the United States Telegraph Surveying Expedition, which was accompanied by most able naturalists. In fact, what little we do know about this gull tends to show that its habitat is extremely restricted; but upon this point it is needless to say more, as our Arctic expedition will, we trust, give us some further account of it."

Now that we know that Nordenskjold's Vega expedition obtained a specimen on the northeastern coast of Siberia, and the Point Barrow party collected numerous specimens at that locality, the occurrence of stragglers of the species in question on the coast of Kamtschatka is not stranger than its accidental appearance in Yorkshire or in Heligoland.

27. **Rissa tridactyla pollicaris** STEJN. (p. 78).

28. **Rissa brevirostris** (BRUCH) (p. 82).

29. **Gavia alba** (GUNN.).

TACZAN., B. S. Z. F., p. 1883, 341.

30. **Sterna camtschatica** PALL. (p. 83).

31. **Sterna paradisæa** BRÜNN. (p. 85).

? ? **Sterna leucoptera** SCHINZ.

The statement of Pallas that this species (*St. fissipes*, Z. R. A., II, p. 338) "also occurs in Kamtschatka" is too vague to be accepted without confirmation.

32. Stercorarius parasiticus (LIN.) (p. 86).

33. Stercorarius longicaudus VIEILL. (p. 87).

PROCELLAROIDEÆ.

34. Diomedea albatrus PALL. (p. 89).

35. ? Diomedea nigripes AUDUB.

TACZAN., B. S. Z. F., 1882, p. 398.

This species is enumerated with a query, since there is a probability that the bird recorded from "les rivages du Kamtschatka" is nothing but a young *D. albatrus*.

36. Fulmarus glacialis glupischa STEJN. (p. 91).

37. Puffinus tenuirostris (TEMM.) (p. 96).

? **Œstrelata desolata** (GM.).

A specimen in the Leyden Museum is said by Bonaparte (Consp. Av., II, p. 189) and Schlegel (Mus. P. B. Procell., p. 13) to have come from Kamtschatka. Like similar statements it requires confirmation.

38. Oceanodroma leucorhoa (VIEILL.) (p. 97).

39. Oceanodroma furcata (GM.) (p. 98).

SCOLOPACOIDEÆ.

40. Hæmatopus osculans (SWINH.) (p. 100).

41. Arenaria interpres (LIN.) (p. 102).

42. Charadrius squatarola (LIN.) (p. 103).

43. Charadrius dominicus fulvus (GM.) (p. 104).

44. Ægialitis mongola (PALL.) (p. 105).

45. Gallinago gallinago (LIN.) (p. 110).

46. Gallinago hyemalis (EWERSM.) ?

TACZAN., B. S. Z. F., 1883, p. 340.

47. Arquatella couesi (RIDGW.) (p. 112).

48. Actodromas acuminatus (HORSF.) (p. 115).

49. Actodromas damacensis (HORSF.) (p. 116).

50. Actodromas ruficollis (PALL.) (p. 118).

51. Actodromas temminckii (LEISL.) (p. 119).

52. Pelidna alpina pacifica (COUES) (p. 120).

Tringa cinclus MIDD., Isep. Russl., p. 125.

53. Calidris arenaria (LIN.) (p. 122).

54. Limosa lapponica baueri (NAUM.) (p. 122).

55. Limosa ægocephala melanuroides (GOULD).

Limosa melanura KITTL., Denkw., II, pp. 294, 314.—*L. melanuroides* TACZAN., B. S. Z. F., 1883, p. 340.—BOGDAN., C. A. I. R., I, p. 85.

Pseudototanus guttifer (NORDM.) (p. 124).

57. Totanus nebularius (GUNN.) (p. 128).

58. Totanus ater (SANDER) (p. 129).

59. Totanus glareola (LIN.) (p. 130).

60. Pavoncella pugnax (LIN.).

Trynga pugnax PALLAS, Z. R. A., II, p. 191:

"In Camtschatca raro apparent." Dybowski's hunter secured two specimens on Bering Island during the spring migration of 1883.

61. Actitis hypoleucos (LIN.) (p. 131).

62. Terekia cinera (GÜLD.) (p. 132).

63. Heteractitis incanus (GM.) (p. 132).

64. Heteractitis brevipes (VIEILL.) (p. 137).

65. Numenius cyanopus (VIEILL.).

N. arguata MIDD., Isep. Russl., p. 125.
N. australis SCHRENCK, R. Amurl., I, p. 433; BOGDAN., C. A. I. R., I., p. 82.
N. tahitiensis TACZAN., B. S. Z. F., 1832, p. 397, and 1883, p. 340.

66. Numenius phæopus variegatus (SCOP.) (p. 138).

67. Phalaropus lobatus (LIN.) (p. 139).

68. Crymophilus fulicarius (LIN.) (p. 140).

It may be added here that Merck observed this species, "circa Camtschatcam," according to Pallas (Z. R. A., II, p. 205).

GRUOIDEÆ.

69. Grus grus orientalis (BLYTH)?

Steller (Beschr. Kamtsch., p. 142) speaks of the crane, and "*Grus vulgaris*" is said by Pallas (Z. R. A., II, p. 106) to have been observed in Kamtschatka during the migrations. The natives of Bering Island also told me of a bird, according to their description evidently a Crane, which is occasionally seen at the island. The specific name as given above is merely conjectural, of course.

ANATOIDEÆ.

70. Anser segetum middendorffi (SEVERZ.) (p. 141).

A. s. MIDD., Isep. Russl., p. 126.

Taczanowski mentions two species of Geese of this group from Kamtschatka: "*A. grandis* MIDD." and "*A. segetum* LIN." Probably both belong to the present species.

71. Anser albifrons gambeli (HARTL.) p. (145).

A. a. MIDD., Isep. Russl., p. 126.

72. Chen hyperboreus (PALL.).

Anser h. PALLAS, Z. R. A., II, p. 228:

"Rarissimi apparent in Camtschatca." During the early autumn of 1883 the native hunters on Bering Island observed what they called "Swans with black wings," probably individuals of this species.

73. Branta canadensis hutchinsii (RICH.) (p. 147).

"Anser pictus," KITTL., Denkw., II, p. 384, by the inhabitants called "Bjeloscheika" (= white-throat), is probably this species.

74. Branta nigricans (LAWR.) (p. 149).

75. Cygnopsis cygnoides (PALL.).

PALLAS, Z. R. A., II, p. 219.—TACZAN., B. S. Z. F., 1883, p. 343.

76. Olor cygnus (LIN.) (p. 149).

77. Olor columbianus (ORD) (p. 150).

78. Anas boschas (LIN.) (p. 152).

79. Dafila acuta (LIN.) (p. 153).

80. Nettion crecca (LIN.) (p. 155).

81. Querquedula querquedula (LIN.) (p. 156).

82. Eunetta falcata (GEORGI) (p. 156).

Anas f. MIDD., Isep. Russl., p. 126.

83. Eunetta formosa (GEORGI).

TACZAN., B. S. Z. F., 1883, p. 343.

84. Mareca penelope (LIN.) (p. 157).

85. Mareca americana (GM.) (p. 158).

86. Spatula clypeata (LIN.) (p. 159.)

87. Aythya fuligula (LIN.) (p. 160).

88. Aythya marila (LIN.) (p. 160).

?? **Aythya ferina** (LIN.).

During the spring of 1883 a Duck was described to me by a Bering Island hunter as being exactly like the "Tschernick" (*A. marila*), but with red instead of black head. He had seen a pair in Kamennij Valley. They may have belonged to this species.

89. Clangula clangula (LIN.) (p. 163).

90. Charitonetta albeola (LIN.) (p. 166.)

91. Histrionicus histrionicus (LIN.) (p. 166).

92. Harelda hyemalis (LIN.) (p. 169).

93. Eniconetta stelleri (PALL.) (p. 170).

94. Somateria v-nigra GRAY (p. 173).

95. Somateria spectabilis (LIN.).

STELLER, Beschr. Kamtsch., p. 188.—PALLAS, Z. R. A., II, p. 237.—TACZAN., B. S. Z. F., 1883, p. 344.

96. Oidemia americana (SW. & RICH.) (p. 174).

97. Oidemia deglandi BP. (p. 174).

98. Merganser merganser (LIN.) (p. 176).

99. Merganser serrator (LIN.) (p. 178).

100. Mergus albellus LIN. (p. 178).

PHALACROCORACOIDEÆ.

101. Phalacrocorax perspicillatus PALL. (p. 180).

102. Phalacrocorax urile (GM.) (p. 181).

103. Phalacrocorax pelagicus PALL. (p. 187).

?? **Phalacrocorax carbo** PALLAS.

Z. R. A., II, p. 297: "Vulgares usque in Camtschatcam." Perhaps the Japanese form may occur on the western shore near the southern extremity of the peninsula.

TETRAONOIDEÆ.

104. Urogallus parvirostris kamtschaticus (KITTL.) (p. 192).

? ? Falcipennis falcipennis (HARTL.).

Occasionally "Kamtschatka" is given as the habitat of this species. It seems not to occur there, however, and the statement is probably due to some earlier author who ignorantly supposed that all the countries surrounding the Okotsk Sea belonged to Kamtschatka. It must be remarked, however, that also Bogdanow (Consp. Av. Imp. Ross., I, p. 30) (1884) gives Kamtschatka as the habitat of this bird.

? ? Bonasa albigularis BREHM.

Brehm, in Naumannia, 1855, p. 287, described it in the following words: "Bonasia albigularis, mento albo. Kamtschatkalis." In J. f. Orn., 1860, p. 393, is a statement that the specimen was originally brought from Kamtschatka by Tilesius. No one else has found the Hazel Grouse in Kamtschatka. The specimen may be from Siberia, though, and is possibly identical with Menzbier's *B. griseiventris*, in which case Brehm's name would have priority; even Pallas says, "in Camtschatca, Stellero observante, deest."

"Graue Rebhüner befinden sich allein um *Werchoi Ostrog*, doch sehr selten" (Steller, Beschr. Kamtsch., p. 193.) Gray Partridges! May they not, perhaps, be one of the two mentioned?

105. Lagopus lagopus (LIN.) (p. 194).

106. Lagopus mutus (MONTIN)?

TACZAN., B. S. Z. F., 1883, p. 338.—*L. alpinus* BOGDAN., C. A. I. R., I, p. 33.—DYB., B. S. Z. F., 1883, p. 368.

The Ptarmigan found in the mountains of the peninsula has not been satisfactorily determined. It would be no surprise if it should prove to be distinct. It is pretty safe to say, however, that it is not typical *mutus*.

107. Lagopus ridgwayi STEJN. (p. 194).

ACCIPITROIDEÆ.

108. Falco rusticolus LIN. (p. 203).

109. Falco islandus BRÜNN. (p. 204).

110. Falco pealei RIDGW. (p. 206).

111. Falco peregrinus TUNST.?

TACZAN., B. S. Z. F., 1883, p. 330.

The description of an adult male given by Taczanowski seems to indicate *F. pealei*. The exact identification cannot be made without examining the specimen, and *F. peregrinus* is therefore retained with a query.

112. Falco subbuteo LIN.

PALLAS, Z. R. A., I, p. 332.—*Hypotriorchis s.* TACZAN., B. S. Z. F., 1882, p. 384.—DYB., *ibid.*, p. 352.

113. Astur candidissimus DYBOW.

Accipiter astur PALLAS, Z. R. A., I, p. 370.—*Astur palumaribus*, "weissliche Varietät," KITTL., Denkw., II, p. 344.—*A. atricapillus* "albino complete," TACZAN., B. S. Z. F., 1883, p. 332.—*Astur candidissimus* DYBOW., *ibid.*, p. 353.

Steller is the first author to mention the White Hawk: "Eine besondere Sorte weisser Habichte" (Beschr. Kamtsch., p. 194).

? **Astur palumbarius** (LIN.).

Taczanowski (B. S. Z. F., 1883, p. 331), under the heading of *Astur striocapillus*, mentions having received a "young female from Bolszeiethk [Bolscheretschk ?], differing from a female from Quebec, in similar plumage, by having the general color much clearer," &c. The identification of this specimen is extremely doubtful; it is probably only a young of *A. candidissimus*.

114. Accipiter nisus (LIN.).

TACZAN., B. S. Z. F., 1883, p. 332.—DYB., *ibid.*, p. 355.

115. Archibuteo lagopus (BRÜNN.) (p. 208).

116. Aquila chrysaëtos (LIN.).

Aquila nobilis PALLAS, Z. R. A., I, p. 341.—*A. ch.* TACZAN., B. S. Z. F., 1883, p. 329.—DYB., *ibid.*, p. 351.

? **Aquila clanga** PALLAS (Z. R. A., I, p. 351; "usque in Camtschatcam") is probably the same bird which Steller mentions as "*Nasvia*" (Beschr. Kamtsch., p. 193). But where refer it?

117. Haliæetus leucocephalus (LIN.) (p. 209).

118. Haliæetus hypoleucus RIDGW. (p, 213).

119. Haliæetus albicilla (LIN.) (p. 216).

Aquila a. MIDD., Isep. Russl., p. 123.

120. Thalassoaetus pelagicus (PALL.) (p. 217).

Aquila p. MIDD., Isep. Russl., p. 123.

121. Pandion haliætus (LIN.) (p. 219).

Falco h. MIDD., Isep. Russl., p. 123.

STRIGOIDEÆ.

122. Asio otus (LIN.).

Otus vulgaris TACZAN., B. S. Z. F., 1882, p. 385.

123. Asio accipitrinus (PALL.) (p. 220).

Megascops scops (LIN.).

Scops kamtschatkensis BP., Rev. et Mag. de Zool., 1854 (p. 543).

Scops gia SCOPOLI.—SHARPE, Brit. Mus. Cat., II, p. 47 (1875).

"A French specimen collected by Mr. Swainson is in the Cambridge Museum, and nearly equals in intensity the type of *Scops kamtschatkensis* in the Paris Museum. I carefully compared this with ordinary European examples, and can affirm with certainty that it is nothing but a more than ordinarily rufous *Scops gia*; no authority for its Kamtschatkan habitat exists beyond the assertion of the late M. Jules Verreaux.

"In the Paris Museum there is another specimen marked as from Kamtschatka, and absolutely identical with ordinary European specimens." (SHARPE, *l. c.* pp., 50, 51.)

The locality requires confirmation.

? **Ulula sp.**

Strix barbata PALLAS, Z. R. A., I, p. 318.—"Stellero frequenter ad Lenam inque Camtschatca observata."

124. Nyctea nyctea (LIN.) (p. 221).

125. Surnia ulula (LIN.).

Strix nisoria KITTL., Denkw, II, p. 409.

S. u., DALL. & BANNIST., Tr. Chicago Acad., I, 1869, p. 274.—TACZAN., B. S. Z. F., 1883, p. 332.—DYBOW., B. S. Z. F., 1883, p. 355.

The latter says that "ils ont les raies blanches caudales distinctement plus larges et d'une nuance plus pure," and Dall mentions a specimen from Petropaulski as "remarkably light colored." The Kamtschatkan bird may be subspecifically separable.

CUCULOIDEÆ.

126. Cuculus canorus telephonus (HEINE). (p. 224.)

C. c. MIDD., Isep. Russl., p. 124.

127. Cuculus peninsulæ STEJN. (p. 227.)

PICOIDEÆ.

?? Dryocopus martius (LIN.).

Dryopicus martius DYBOW., B. S. Z. F., 1883, p. 368.

No specimens obtained; only determined from the voice.

128. Dryobates purus STEJN. (p. 230.)

129. Dryobates immaculatus STEJN. (p. 231.)

? Dryobates sp.

Picus cirris PALLAS, Z. R. A., I, p. 410:

"Per omnem Rossiam et Sibiriam, usque in Camtschatcam abundat." Not confirmed by later explorers. When considering the greater or lesser probability of the occurrence of a form of *Dryobates leucotus* in Kamtschatka, it must be borne in mind that this species is represented in Japan, as are likewise the two other species of the genus inhabiting the peninsula.

130. Picoides albidior STEJN.

Picus tridactylus KITTL., Denkw., I, pp. 327, 329.
Picoides crissoleucus TACZAN., B. S. Z. F., 1882, p. 396.

MICROPODOIDEÆ.

131. Micropus pacificus Lath.?

Cypselus—KITTL., Denkw. I, p. 338.
? "*Cypselus pacificus* LATH.," DYBOW., B. S. Z. F., 1883, p. 356.

The species is only mentioned by Dybowski with a query and no further details. Kittlitz describes it as "etwa von der Grösse des *C. melba*, doch von meist dunkler Farbe des Unterleibes."

PASSEROIDEÆ.

132. Alauda blakistoni STEJN. (p. 234.)

A. arvensis MIDD., Isep. Russl., p. 124.

133. Nucifraga caryocatactes (LIN.).

Corvus caryocatactes PALL., Z. R. A., I, p. 398.
N. c. KITTL., Denkw. I, p. 335.—TACZAN., B. S. Z. F., 1882, p. 392.

134. Corvus corax LIN.

Corvus corax PALL., Z. R. A., I, p. 380.—KITTL., Denkw., I, p. 313.
Corvus corax kamtschaticus DYBOW., B. S. Z. F., 1883, p. 362.

The difference of the present bird from the typical *corax* is not clearly stated by Dr. Dybowski.

135. Corvus behringianus (DYBOW.). (p. 237.)

136. Corvus corone levaillantii (LESS.). (p. 239.)

137. Pica camtschatica STEJN. (p. 241.)

?? Corvus glandarius PALLAS.

Z. R. A., I, p. 394: "Dantur vero in Camtschatica australiore."

?? Cyanocitta stelleri (GM.).

CAB., Mus. Hein., I, p. 221 (1851).

The only specimen in the Museum Heineanum is given as coming from "*Kamtschatka*" (p. 222), but the locality is in all probability erroneous, as in many other instances in the same collection.

138. Hypocentor aureolus (PALL.) (p. 244.)

Emberiza a. MIDD., Isep. Russl., p. 124.

139. Hypocentor rusticus (PALL.) (p. 246.)

140. Hypocentor variabilis (TEMM. & SCHL.) p. (247.)

141. Emberiza schœniclus (LIN.).

Schœnicola arundinacea TACZAN., B. S. Z. F., 1882, p. 392.—DYB., *ibid.*, 1883, p. 364.

142. Plectrophenax nivalis (LIN.) (p. 248.)

143. Calcarius lapponicus (LIN.) (p. 250.)

144. Acanthis linaria (LIN.) (p. 252.)

145. Acanthis linaria holbœllii (BREHM.) (p. 256.)

146. Acanthis hornemannii exilipes (COUES) (p. 258.)

147. Leucosticte brunneonucha (BRANDT).

Fringilla b. MIDD., Isep. Russl., p. 124.

KITTL., Denkw., I, p. 336.—TACZAN., B. S. Z. F., 1882, p. 393.—DYB., *ibid.*, 1883, p. 364.

148. Leucosticte griseonucha (BRANDT) (p. 261.)

149. Fringilla montifringilla (LIN.) (p. 264.)

150. Chloris kawarahiba (TEMM. & SCHL.) (p. 265.)

151. Coccothraustes coccothraustes (LIN.)?

Coccothraustes vulgaris MIDD., Isep. Russl., p. 124.

According to Middendorff this species was observed or collected (?) by Vossnessenski at the Kamtschatka River (57° N. Lat.), March 18, 1848 (old style, = March 30, new style). Has not been observed since.

152. Pyrrhula pyrrhula kamtschatica (TACZAN.).

Pyrrhula rubicilla PALL., Z. R. A., II, p. 8.—KITTL., Denkw., I, p. 322.—*P. k.* TACZAN., B. S. Z. F., 1882, p. 395.—DYB., *ibid.*, 1883, p. 367.

153. Carpodacus erythrinus grebnitskii STEJN. (p. 265.)

154. Pinicola enucleator (LIN.).

Cf. BONAP., Coll. Delattre, p. 20.
Loxia enucleator KITTL., Denkw., I, p. 335.
Corythus enucleator TACZAN., B. S. Z. F., 1882, p. 394.
Corythus enucleator kamtschatkensis DYBOW., B. S. Z. F., 1883, p. 367.

Bright specimens have already been separated by v. Homeyer as *P. flammula*, but they hardly constitute a race.

155. Loxia sp. ?

Loxia leucoptera DYBOW., B. S. Z. F., 1883, p. 367.
Loxia bifasciata DYB. & TACZ., B. S. Z. F., 1884, extr. p. 2.

"Une femelle ou un jeune" (!) from Bering Island (Dyb.). The determination of the species is entirely unreliable. The only information as to the occurrence of a Cross-bill in Kamtschatka is furnished by Pallas, who, under *Loxia crucirostra* (Z. R. A., II, p. 4), says: "In Camtschatca cum sylva deest hyeme tota gregaria apparet, voce et cantu rariore."

156. Clivicola riparia (LIN.) (p. 267.)

Hirundo r. MIDD., Isep. Russl., p. 125.

157. Chelidon tytleri (JERDON) (p. 269.)

Hirundo rustica (rufa) MIDD., Isep. Russl., p. 125.

158. Chelidon kamtschatica (DYBOW.).

Hirundo k. DYBOW., B. S. Z. F., 1883, p. 356.
Hirundo borealis DYB. & TACZ., B. S. Z. F., 1884, extr. p. 7.

We have seen the type of this species, and are inclined to regard it as valid.

?? Hirundo lagopoda PALL.

"Ad Camtschatcam usque," says Pallas (Z. R. A., I, p. 533). Nothing definite is known, however, and the statement is very doubtful, though it may be remembered that it is said to occur at Gischiginsk.

159. Ampelis garrulus LIN.

Bombycilla garrula KITTL., Denkw., I, p. 338.—TACZAN., B. S. Z. F., 1882, p. 392.—DYB., *ibid.*, 1883, p. 368.

"La nuance des parties supérieures du corps est un peu plus claire que dans les Oiseaux d'Europe." Taczan., l. c.

160. Lanius cristatus (LIN.?).

Lanius phoenicurus KITTL., Denkw., II, p. 313.—*Otomela ph.* DYB. & TACZ., B. S. Z. F., 1884, extr. pp. 2, 11.
Otomela superciliosa DYBOW., B. S. Z. F., 1883, p. 362.

161. Lanius sibiricus (BOGDAN.).

Lanius major TACZAN., B. S. Z. F., 1882, p. 392.—DYB., *ibid.*, 1883, p. 361.

162. Butalis sibirica (GM.) (p. 272.)

163. Erythrosterna albicilla (PALL.) (p. 273.)

164. Anthus gustavi SWINH. (p. 274.)

165. Anthus japonicus (TEMM. & SCHL.).

A. ludovicianus KITTL., Denkw., II, pp. 340, 357, 385.
A. j. DYBOW., B. S. Z. F., 1883, p. 361.

?? Anthus blakistoni (SWINH.).

Given by Gray (Handl., I, p. 251) as occurring in Kamtschatka, but it is probably only *A. japonicus*.

166. Anthus cervinus (PALL.).

Motacilla cervina PALL., Z. R. A., I, p. 511.
A. c. DYBOW., B. S. Z. F., 1883, p. 361.

167. Pipastes maculatus (HOGDS.) (p. 278.)

Anthus arboreus MIDD., Isep. Russl., p. 124.

168. Budytes flavus leucostriatus (HOMEY.) (p. 280.)

?? **Budytes citreolus** (PALL.).

Motacilla citrinella PALLAS, Z. R. A., I, p. 503:

"Ex regionibus ad Lenam, Camtschatca et insulis versus Americam sparsis habui." This species is not now known east of the Jenisej. What species can Pallas have had?

169. Motacilla melanope PALL. (p. 283.)

170. Motacilla ocularis SWINH. (p. 284.)

171. Motacilla lugens KITTL. (p. 287.)

M. alba MIDD., Isep. Russl., p. 124.

M. japonica DYB. & TACZ., B. S. Z. F., 1884, extr. p. 11.

172. Troglodytes pallescens (RIDGW.) (p. 292.)

I cannot now lay hands on any reference of a Wren having been taken on the mainland of Kamtschatka, but I believe that I have seen such a record somewhere, unless it be the vague statement by Taczanowski, J. f. Orn., 1881, p. 180. The total absence of a species of this genus, which is represented both in the Kurils, and in the Commander Islands, would be very strange.

?? **Calamophilus sibiricus** BP.

BP., Compt. Rend., XLIII, 1856, p. 414.

"Au Kamtschatka vit une race particulière de Mésange des roseaux, pour le moins aussi distincte de la nôtre que les Mésanges du Japon le sont de leurs analogues européens.

"*Calamophilus sibiricus*, Bp., *dilutissime cinamomeus, pileo vix cinereo. Fœm. fere unicolor, macula doreali magna nigra; subtus candida.*"

The locality is probably as unreliable as many others from the same source.

173. Parus ater LIN.

TACZAN., B. S. Z. F., 1882, p. 390.

"Deux individus ont la nuance roussâtre plus forte qu'à l'ordinaire sur le dessous du corps." DYB., *ibid.*, 1883, p. 361.

174. Parus kamtschatkensis (BP.) (p. 297.)

175. Ægithalos caudatus (LIN.)?

Mecistura caudata TACZAN., B. S. Z. F., 1882, p. 392.—DYB., *ibid.*, 1883, p. 361.

The Long-tailed Tits from Kamtschatka probably belong to the Siberian race indicated by Mr. Seebohm.

176. Sitta albifrons TACZAN.

Sitta uralensis KITTL., Denkw., I, p. 321.

S. albifrons TACZAN., B. S. Z. F., 1882, p. 385.—DYB., *ibid.*, 1883, p. 357.

It should be remarked that Temminck's *Sitta sericea* (Man. d'Orn., 2 ed., IV, p. 645) is based in part upon a specimen from Kamtschatka.

?? **Cinclus pallasii** TEMM.

Schrenck (Reis. Amurl., I, p. 335) speaks of this species as occurring in Kamtschatka. The statement is wholly unconfirmed and probably incorrect. It is based

upon the statement of Pallas (R. A., Z. I., p. 424) that "*Sturnus cinclus*" "per omnem Rossiam et Sibiriam, in Camtschatcam. . . . non infrequens observatur."

177. Acrocephalus ochotensis (MIDD.) (p. 299.)

178. Locustella hendersonii (CASS.) (p. 300.)

179. Phyllopseustes borealis BLAS (p. 302.)

180. Phyllopseustes xanthodryas (SWINH.) (p. 304.)

181. Phyllopseustes homeyeri DYBOW.

DYBOW., B. S. Z. F., 1883, p. 358.

We have no means of ascertaining the status of this alleged species.

??? Hylocichla alicise (BAIRD).

This species has been attributed to Kamtschatka by Mr. E. W. Nelson, but the statement is evidently based upon a mistake. Cf. my notes in "The Auk," 1884, p. 166.

182. Turdus eunomus TEMM. (p. 307.)

Turdus pilaris, "in Camtschatca, Stellero teste," Pallas, Z. R. A., I. p. 456, is evidently *T. eunomus*.

183. Turdus obscurus GM. (p. 307.)

Turdus chrysolaus DYBOW., B. S. Z. F., 1883, p. 359.

? Phœnicurus auroreus (PALL.).

Motacilla phœnicurus PALLAS, Z. R. A., I. p. 476:

"Stellerus etiam in Camtschatca et Curilis insulis dari prodidit" It is not improbable that this Red-start may occur towards the southern extremity of the peninsula.

184. Ianthia cyanura (PALL.) (p. 308.)

185. Cyanecula suecica (LIN.).

C. cærulecula DYBOW., B. S. Z. F., 1883, p. 359.

186. Melodes calliope (PALL.) (p. 309.)

Sylvia c. MIDD., Isep. Russ., p. 125.

APPENDIX TO THE SYNOPSIS OF BIRDS REPORTED TO INHABIT KAMTSCHATKA.

APPENDIX TO THE SYNOPSIS OF BIRDS REPORTED TO INHABIT KAMTSCHATKA.

While the foregoing list is going through the press I receive the "Liste des Oiseaux du Kamtschatka et des îles Comandores, par le Dr. B. Dybowski et L. Taczanowski" (Extr. du Bulletin de la Société Zoologique de France, t. IX, 1884), which necessitates some additional remarks on my part.

Aquila nobilis PALL. is given as distinct from *A. chrysaëtos*, and both as occurring in Kamtschatka.

"*Archibuteo lagopus ferrugineus*," is given as occurring on Bering Island against *A. lagopus* from Kamtschatka. As to the identity of the Bering Island bird, see this work, p. 208. *Archibuteo ferrugineus* is a perfectly good species from Western North America, south of Washington Territory, which not even the wildest trinominalist ever thought of uniting with *A. lagopus*. Indeed, to use Dr. Coues's words, it is "one of the handsomest and most distinctively marked hawks of North America, somewhat recalling *Buteo albocaudatus*." It is "pure white underneath, from bill to end of tail, the legs rich rufous or bright chestnut, barred with black, in marked contrast; usually a few chestnut bars or arrow-heads on the belly and flanks, and the breast with sharp shaft lines of black." Taczanowski says of his birds that "Ils ont tous l'abdomen largement brun, tout le devant des parties inférieures isabelle-roussâtre, varié de stries brunes," &c. It is unnecessary to remark that they have not the faintest relation to *A. ferrugineus*. Dybowski's and Taczanowski's misidentification is most extraordinary!

Falco peregrinus.—From the comparison with the bird from Bering Island (*Falco pealei*) it appears as if the Kamtschatkan bird might be the typical *peregrinus*.

Astur palumbarius.—The authors concede, as suggested by me on p. 320, that their *atricapillus* is only the young *candidissimus*.

Asio otus should be stricken out of the list. The authors state that it was "inscrit par erreur au lieu de l'*O. brachyotus*."

Chelidon tytleri.—The authors have treated of the two Kamtschatkan swallows in an extremely confused manner. After Mr. Taczanowski, in 1883 condemned *Hirunda saturata*, which the authors call "*Hirundo rustica, saturata* Smith." (distinguée récemment dans les publications de l'Institution Smithsonienne!!) as identical with *H. gutturalis*, the authors now go so far as to even separate it from the Baical form to which they apply the new term *H. baïcalensis*. We now know that both are identical with *Ch. tytleri*. But the other form is treated of in a still more peculiar manner. In 1883 Dybowski described a swallow from Petropaulski as new under the name of *H. kamtschatica*. In the diagnosis he says: "Abdomen et sous-caudales blancs, les deux plus longues de ces dernières traversées par une large bande antéapicale noirâtre, avec un léger éclat d'acier." This form the authors now give as a synonym (Extr., p. 8) of *H. saturata*, which they describe as "Subtus intense rufa." But the very specimen (I do not think there exists in collections more specimens than the type which I have seen myself) is redescribed as *Hirundo borealis* ("pour cette forme qui paraît inédite"), as is evident from the diagnosis: "Subtus alba, subcaudalibus binis posterioribus fascia apicali nigra."

After this the synonymy of the two forms stands thus:

CHELIDON TYTLERI.

Hirundo saturata
Chelidon saturata } Ridgway, Stejneger.
Hirundo gutturalis Taczanowski.
Hirundo rustica, saturata
Hirundo baïcalensis } Dybowski et Taczanowski.
Hirundo rustica, baïcalensis

CHELIDON KAMTSCHATICA.

Hirundo kamtschatica Dybowski.
Chelidon kamtschatica, Stejneger.
Hirundo borealis
Hirundo rustica, borealis } Dybowski et Taczanowski.
Hirundo rustica, kamtschatica

The authors assert that this form "n'est que de passage et se rend plus au nord pour le temps de la nidification." It may be permitted to ask from what source the authors have derived their knowledge as to where this bird breeds.

Turdus chrysolaus is now dropped as a Kamtschatkan bird, the authors asserting that it "nous paraît être le jeune du *T. obscurus* Gm."

Lagopus ridgwayi.—Most curiously all references to a ptarmigan occurring on the islands have been dropped altogether.

33.1. Stercorarius pomarinus.—This species is given in the "Liste" (p. 3, No. 111) under the name of *Lestris pomarina*, as occurring in Kamtschatka and Bering Island. If the information is reliable, this constitutes a veritable addition to the number of Kamtschatkan species.

Diomedea nigripes "Audub." is now given as the only albatros from Kamtschatka and Bering Island. I need hardly add that the identification is entirely erroneous, but it proves that I was completely justified in the suspicion expressed by me above under No. 35 (p. 316).

78.1. Chaulelasmus streperus.—This species is given as obtained on Bering Island. It has probably been taken during the spring migration, 1883, while I was in Petropaulski.

Merganser merganser.— The authors identify the Kamtschatkan and Bering Island birds as "*Mergus merganser americanus*," saying, however, that "Le mâle adulte ne se distingue de celui de la forme européenne que par la couleur de l'abdomen, rosée au lieu de saumon, et par le vert brillant du sommet de la tête et du cou, remplacé par le violet." Compared with what has been said above of the two species (p. 176 *seqv.*) it is plain that Messrs. Dybowski and Taczanowski are entirely mistaken in their identification.

Brachyramphus kittlitzii.—The "*Brachyramphus* sp. ?" of the former lists has now been changed to "*Synthliborhynchus* sp. ?" (*Synthliborhynchus* sic!). What is it, after all, if it is not *B. kittlitzii* ?

Cerorhinca monocerata has been dropped altogether, without good reason, as it seems.

The effect of this "Liste" upon the foregoing synopsis is as follows:

We have to eliminate Nos. 35 and 122, and to add *Stercorarius pomarinus* and *Chaulelasmus streperus*. The number of well authenticated birds is, therefore, still 186, as in my synopsis.

III.—CONCLUSIONS.

It is not my intention, in the present connection, to enter into a detailed discussion of the components of the ornis of the Commander Islands, referring such conclusions to a subsequent number of my "Contributions to the History of the Commander Islands," but a few remarks as to their position in relation to the peninsula may not be out of place here.

From the second part of this book, compared with the first table, given below, it is evident that the ornis of the islands is chiefly Kamtschatkan, since only eleven species have been taken on them which do not belong to the Kamtschatkan fauna. Of these eleven only five species are of American origin, of which three are merely accidental stragglers; three are Aleutian (one extinct), and three are peculiar to the islands.

The rest of the ornis is Kamtschatkan, although among the regular inhabitants the proportion between land and water birds is considerably different from what we find on the Kamtschatkan mainland, which is well wooded while the Commander Islands can hardly show a shrub 6 feet high. That an enumeration of the birds actually taken on the islands does not bring this difference out very strikingly is due to the fact that a great many land birds, especially during the migrations, are blown over to the islands across the not more than 100-mile wide strait which separates them from the peninsula.

In now turning our attention to the fauna of the peninsula itself, we will have to base our conclusions and calculations upon the list given in the second part of this book. Meager as it is, and uncertain as the status of many of the forms enumerated still are, it is thought of sufficient accuracy to allow certain more general conclusions to be made, which may serve as a base for future investigations.

In order to obtain a correct idea of the ornis of Kamtschatka it will be necessary first to eliminate from the above list certain species which do not properly belong to it. The Commander Islands, though zoologically a part of Kamtschatka, show a certain admixture of American forms on account of their neighborhood to the other Aleutian Islands, besides possessing forms peculiar to themselves. It would, therefore,

manifestly obscure the results were we to take into account those species which never have been observed on the peninsula proper, nor are likely ever to occur there except as accidental stragglers. These forms are contained in the following table, but it must be observed that it does not embrace all species which have only been recorded from the islands and not from the mainland, since such forms which have, probably, only been overlooked on the latter, especially Circumpolar, Palæarctic, Pacific, and East-Asiatic forms, may be regarded as truly Kamtschatkan.

TABLE I.—*Birds, American or peculiar to the Commander Islands, which do not occur in Kamtschatka.*

Heteractitis incanus.
Olor columbianus.
Mareca americana.
Charitonetta albeola.
Phalacrocorax perspicillatus.
Lagopus ridgwayi.
Falco pealei.
Haliæetus leucocephalus.
Corvus behringianus.
Leucosticte griseonucha.
Troglodytes pallescens.

This virtually reduces the number of Kamtschatkan birds to 175.

Before entering into a discussion of their geographical distribution it may be well to show to which geographical categories the different species belong.

TABLE II.—*Circumpolar forms.*

Colymbus auritus.
Urinator adamsii.
arcticus.
lumme.
Larus glaucus.
Gavia alba.
Sterna paradisæa.
Stercorarius parasiticus.
longicaudus.
pomarinus.
Oceanodroma leucorrhoa.
Arenaria interpres.
Charadrius squatarola.
Calidris arenaria.
Phalaropus lobatus.
Crymophilus fulicarius.
Chen hyperboreus.
Anas boschas.
Dafila acuta.
Chaulelasmus streperus.
Spatula clypeata.
Histrionicus histrionicus.
Harelda hyemalis.
Eniconetta stelleri.
Somateria spectabilis.
Merganser serrator.
Lagopus lagopus.
Falco rusticolus.
islandus.
Archibuteo lagopus.
Aquila chrysaëtos.
Asio accipitrinus.
Nyctea nyctea.
Plectrophenax nivalis.
Calcarius lapponicus.
Acanthis linaria.
holbœllii.
Pinicola enucleator.
Ampelis garrulus ?

TABLE III.—*Palæarctic forms.*

	Falco peregrinus?
ıs.	subbuteo.
ıago.	Accipiter nisus.
ımiæckii.	Haliæetus albicilla.
rius.	Pandion haliætus.
	Surnia ulula.
s.	Nucifraga caryocatactes.
ıax.	Corvus corax.
ɔcs.	Emberiza schœniclus?
	Fringilla montifringilla.
	Coccothraustes coccothraustes?
ıerquedula.	Loxia, sp.
e.	Clivicola riparia.
.	Anthus cervinus.
	Motacilla melanope?
ıla.	Parus ater?
anser.	Ægithalos caudatus?
.	Cyanecula suecica.
?	

TABLE IV.—*Pacific forms.*

ı.	Larus glaucescens.
ornica.	schistisagus.
ɔa.	cachinnans.
	kamtschatkensis.
marmoratus.	Rissa tridactyla pollicaris.
kittlitzii.	brevirostris.
us antiquus.	Diomedea albatrus.
ygmæus.	Fulmarus glacialis glupischa.
ristatellus.	Puffinus tenuirostris.
usillus.	Oceanodroma furcata.
ocerata.	Arquatella couesi.
ɔsittaculus.	Somateria v- nigra.
	Phalacrocorax urile.
iculata.	pelagicus.

TABLE V.—*American forms.*

ıllii.	Branta nigricans.
ıacifica.	Oidemia americana.
gambeli.	deglandi.
ıis hutchinsii.	Acanthis hornemannii exilipes.

TABLE VI.—*Siberian forms.**

inicus fulvus.	Hypocentor rusticus.
ɔla.	Lanius sibiricus.
alis?	Anthus gustavi.
.	Phyllopseustes borealis.
eolus.	

n forms" are meant species inhabiting the whole portion of the Palæst of the Ural Mountains, besides a few forms which have pushed their west, toward the Baltic, but without reaching the Atlantic Ocean.

TABLE VII.—*East Asiatic* or peculiar forms.*

Sterna camtschatica.
Hæmatopus osculans.
Actodromas acuminatus.
damacensis.
ruficollis.
Limosa lapponica baueri.
ægocephala melanuroides.
Pseudototanus guttifer.
Heteractitis brevipes.
Numenius cyanopus.
phæopus variegatus.
Grus grus orientalis?
Anser segetum middendorffi.
Cygnopsis cygnoides.
Eunetta falcata.
formosa.
Urogallus parvirostris kamtschaticus.
Astur candidissimus.
Haliætus hypoleucus.
Thalassoaëtus pelagicus.
Cuculus canorus telephonus.
peninsulæ.
Dryobates purus.
immaculatus.
Picoides albidior.
Micropus pacificus?
Alauda blackistoni.
Corvus corone lavaillantii.
Pica camtschatica.
Hypocentor variabilis.
Leucosticte brunneonucha.
Chloris kawarahiba.
Pyrrhula pyrrhula kamtschatkensis.
Carpodacus erythrinus grebnitskii.
Chelidon tytleri.
kamtschatica.
Lanius cristatus.
Butalis sibirica.
Erythrosterna albicilla.
Anthus japonicus.
Pipastes maculatus.
Budytes flavus leucostriatus.†
Motacilla ocularis.
lugens.
Parus kamtschatkensis.
Sitta albifrons.
Acrocephalus ochotensis.
Locustella hendersoni.
Phyllopseustes xanthodryas.
homeyeri.
Turdus eunomus.
obscurus.
Ianthia cyanura.
Melodes calliope.

The number of species of each group and their percentage, as compared with the total number of Kamtschatkan birds, 175, may be tabulated thus:

TABLE VIII.

39 species are *Circumpolar*, or about.....22.3 per cent.
37 species are *Palæarctic*, or about .....21.1 per cent.
28 species are *Pacific*, or about .....16. per cent.
8 species are *American*, or about..... .... 4.6 per cent.
9 species are *Siberian*, or about..... 5.1 per cent.
54 species are *East Asiatic or peculiar*, or about.....30.9 per cent.

This includes all the birds which are supposed to have been obtained in Kamtschatka. The ornis of a country does not properly consist of all these, as in most cases a considerable number of occasional and ac-

*Such forms are regarded as East Asiatic which, ordinarily, do not occur west of the Jenisej River.

†This form, belonging to an exclusively Palæarctic group of birds, is here treated as Asiatic, notwithstanding the fact that a small colony breeds in Northern Alaska.

cidental visitors enter the faunal lists, which, strictly, should be kept aside as foreign elements. The list of Kamtschatkan birds, however, appears to embrace but very few forms which do not occur regularly in one or the other part of the peninsula. There are apparently four causes of this peculiarity of the list, the first being that comparatively few irregular visitors find their way to it on account of its isolated position; second, that no general migration route between countries to the north and south seems to pass through the region; third, that the extreme districts which adjoin neighboring regions are entirely unexplored; and fourth, that, since Steller's time, no ornithologist who was a hunter himself has resided in the country for more than a few months. In thickly settled countries, where all the common birds are known, every unusual and rare visitor is soon found out and reported (cf. 165 occasional visitors, against 211 regular inhabitants of the British ornis); but not so in Kamtschatka, where the 175 names may practically be regarded as representing the number of species actually belonging to the fauna.

But not all of these throw particular light upon the relationship of the ornis, except in a general way. Many forms are so generally distributed over large areas and show so little variation that they are less fit to illustrate those features of the geographical distribution, which are of special interest. Others again are so closely limited in their distribution by the character of the localities they inhabit as to give very unreliable material for comparison. This is eminently true of many water birds, a great many of which in their distribution characterize the faunal areas of the ocean and not those of the land. They will therefore have to be considered separately. It will be seen that in this case, at least, the habits have a considerable influence upon the geographical distribution; the old-fashioned system, chiefly based upon teleological characters, may therefore, in this connection, offer some advantages over those aiming at morphological characters for their basis. For this purpose we shall partly apply a division of the birds into "swimmers," "waders," "game birds," "birds of prey," "picarians," and "perchers," in the old sense of these appellations, a course which, in some measure, will facilitate a comparison of some of the results here arrived at with those of earlier writers.

The old observation that the proportional number of species of water birds (swimmers and waders) increases toward the Arctic region is confirmed by the following table, which shows that of all the birds oc-

curring in Kamtschatka the species of water birds are more numerous than those of the other divisions together:

TABLE IX.

70 swimmers, or	40. per cent.
29 waders, or about	16.6 per cent.
3 game birds, or about	1.7 per cent.
15 birds of prey, or about	8.6 per cent.
6 picarians, or about	3.4 per cent.
52 perchers, or about	29.7 per cent.

Recalling what we said above in regard to the peculiarity of birds living at the sea characterizing the marine regions rather than the terrestrial provinces of the earth, we at once direct our attention to the 70 species of Kamtschatkan "swimmers" or "*natatores*" of some systematists.

The swimmers are divisible into two categories, marine and fluviatile natatores, the former group being, of course, the one of interest in the present connection. It embraces the following species:

TABLE X.—*Kamtschatkan Marine Natatores.*

1. Uria lomvia arra.	18. cachinnans.
2. troile californica.	19. kamtschatkensis.
3. Cepphus columba.	20. canus.
4. carbo.	21. Rissa tridactyla pollicaris.
5. Brachyramphus marmoratus.	22. brevirostris.
6. kittlitzii.	23. Gavia alba.
7. Synthliboramphus antiquus.	24. Stercorarius pomarinus.
8. Simorhynchus pygmæus.	25. Diomedea albatrus.
9. cristatellus.	26. Fulmarus glacialis glupischa.
10. pusillus.	27. Puffinus tenuirostris.
11. Cerorhinca monocerata.	28. Oceanodroma leucorhoa.
12. Cyclorrhynchus psittaculus.	29. furcata.
13. Lunda cirrhata.	30. Eniconetta stelleri.
14. Fratercula corniculata.	31. Somateria v-nigra.
15. Larus glaucescens.	32. spectabilis.
16. glaucus.	33. Phalacrocorax urile.
17. Larus schistisagus.	34. pelagicus.

Of these thirty-four species there are only two, viz, *Cepphus carbo* and *Larus kamtschatkensis*, which have not been observed on both sides of the Pacific Ocean. The peculiar character of these birds is furthermore evident from the fact that most of them are exclusively Pacific in their distribution, only seven species, viz,

Larus glaucus,	Oceanodroma leucorhoa,
canus,	Eniconetta stelleri, and
Gavia alba.	Somateria spectabilis,
Stercorarius pomarinus.	

being inhabitants of the Atlantic shores too. In other words, about

80 per cent. of the marine natatores are peculiar to the Pacific. Even more striking, perhaps, is the proportion of the genera, since of twenty genera not less than six, or 30 per cent., are peculiar.

Not less remarkable is the fact that nearly all the Pacific forms are to be found among the marine natatores, since of the one hundred and forty-two species which belong to other categories only one, viz, *Arquatella couesi*, a wader, can be designated as strictly and exclusively Pacific.

If we now look at the remaining swimmers, fluviatile and fluvio-marine, we will find that the great majority of them, or 70 per cent., are Circumpolar or Palæarctic, only the following eleven species being exceptions:

TABLE XI.—*Fluviatile Natatores not Circumpolar nor Palæarctic.*

Colymbus holbœllii.	Cygnopsis cygnoides.
Sterna camtschatica.	Eunetta falcata.
Anser segetum middendorffi.	formosa.
albifrons gambeli.	Oidemia americana.
Branta canadensis hutchinsii.	deglandi.
nigricans.	

Of these more than one-half (six) are species which are also generally distributed in America. While, therefore, these forms indicate a certain influence of that continent, the character and real insignificance of this influence is manifested by the fact that in the other divisions only two species are American, viz, one wader and one percher, *Pelidna alpina pacifica* and *Acanthis hornemannii exilipes*. The number of American forms is surprisingly small indeed.

While thus the American element is smaller than might, perhaps, be expected, the Circumpolar and Palæarctic forms are quite predominant, as a matter of course, making not less than 43.4 per cent. of the whole number of species, or nearly 52.5 per cent. of all the species, minus those of the water birds which are peculiarly Pacific. (Table IV.)

Table XII is prepared to show at a glance the number and percentage of the species of each division as contained in the different ornithogeographical categories.

TABLE XII.

	Swimmers.		Waders.		Game birds.		Birds of prey.		Picarians.		Perchers.		Total number.	Per cent. of 175 species.
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.		
Circumpolar	21	30.	5	17.	1	33.3	6	40.	0	0.	6	11.5	39	22.3
Palæarctic	11	15.7	7	24.	1	33.3	6	40.	0	0.	12	23.1	37	21.1
Pacific	27	38.6	1	3.5	0	0.	0	0.	0	0.	0	0.	28	16.
American	6	8.6	1	3.5	0	0.	0	0.	0	0.	1	2.	8	4.6
Siberian	0	0.	4	14.	0	0.	0	0.	0	0.	5	9.6	9	5.1
East Asiatic or peculiar	5	7.1	11	38.	1	33.3	3	20.	6	100.	28	53.8	54	30.9
Total number	70		29		3		15		6		52		175	

The preponderance of East Asiatic and peculiar forms, both on the whole, and especially in those groups which are of most value for the study of the geographical distribution, is clearly demonstrated by this table. We are, therefore, justified in taking the birds contained in this category as a basis in attempting an analysis of the Kamtschatkan ornis, and a comparison of it with that of adjacent countries.

Referring to Table VII, page 338, for an enumeration of the species, the geographical relations of which we are going to discuss here, we may at once tabulate those forms which we regard as peculiar to the peninsula.

TABLE XIII.— *Species peculiar to Kamtschatka.*

Urogallus parvirostris kamtschaticus.
Astur candidissimus.
Haliætus hypoleucus.
Dryobates purus.
immaculatus.
Picoides albidior.
Pica camtschatica.
Pyrrhula pyrrhula kamtschatkensis.
Parus kamtschatkensis.
Sitta albifrons.

It will be seen that this enumeration only comprises residents and none of the several migratory birds which have not yet been reported from any other country, or which breed nowhere except in Kamtschatka. Some one might urge that a species which only breeds in Kamtschatka is peculiar to that country. This is true to a certain degree, but our knowledge of the localities where many or most of the species in question breed, or do not breed, is at present so imperfect as to make the above selection advisable.

The other residents (the exact number of which, as compared with that of the migrants, cannot be ascertained at present), are nearly all Circumpolar or Palæarctic species of wide distribution. Most of these are species which retain a great uniformity all over their enormous range, except a few ones, for instance, *Coccothraustes*, *Parus ater*, *Ægi-*

thalos caudatus, and *Lagopus muta*, which we suspect to be really distinguishable, not having had the opportunity of a personal inspection of specimens.

All the peculiar forms attributed to Kamtschatka, according to Table XIII, are very closely related to Palæarctic forms, with the exception of *Haliœetus hypoleucus*, the status of which is somewhat doubtful, so as to justify us in excluding it from the present discussion. But these forms belong to a class quite different from those mentioned above, being, as they are, of considerable variability, so as to possess representative conspecies or subspecies in the different provinces of the Palæarctic region.*

We have therefore simply found what we, *a priori*, might have expected, viz, that those variable forms which in other countries have been modified, more or less, would show corresponding modifications when occurring in a country of so peculiar a character and so great isolation as the Kamtschatka Peninsula.

The character and amount of this modification is remarkable in several respects. In every instance it consists in an increase of the white color as compared with the nearest allied forms. In fact, *all the peculiarly Kamtschatkan birds possess a greater amount of white than any of their allies, wherever these may reside.* So extreme is this tendency towards whiteness that one species, *Astur candidissimus*, has become entirely white, while another, *Parus kamtschatkensis*, is nearly so.

The example of the Kamtschatkan ornis shows conclusively that the theory of climatic conditions producing the geographical subspecies, races, or whatever they may be styled, does not hold good, at least as far as the increase of the white color at the cost of the others, especially of black, is concerned. It was already recognized long ago, as far back as Gloger's earliest days, that the Siberian ornis generally showed a tendency toward an increase of the white color. A similar tendency seemed to obtain in forms living nearer the Arctic, and consequently it was concluded that the white color was due to the increased cold. Finding now that the peculiar Kamtschatkan forms are considerably whiter than in any other part of Siberia, the natural inference would be that Kamtschatka had a climate much severer than any other place. Since we know that such is not the case, however, the logical conclusion is that the theory of the cold being the direct cause of the increase

* It is interesting to remark in this connection, that all the peculiar forms (with the above exception) have nearly allied representatives in Northwestern Europe.

of the white color must be erroneous. Nor can it be the northerly position, for these white forms are found at 53° north latitude. The peculiarities of a continental climate will not suffice for an explanation, since Kamtschatka is a peninsula surrounded by great sheets of water on nearly all sides.

It may be well to remark that this increase of white is not in the nature of a bleaching or fading of the darker color. They are simply replaced by pure white, and the parts of the body which in the allied forms are white have this color still purer and more dazzling in the Kamtschatkan forms. In the same manner the other colors seem to be purer and, in many instances at least, to be more intense also. The color which seems to suffer most reduction is the black one, but, as remarked, it is only in extent, not in intensity. Without offering any theory for the solution of the question, at present, I would only call attention to the fact that, while the black color of the feathers is due to a pigment, the white color is not, it being caused by the accumulation of colorless air-filled cells. In respect to the changes within the individual feathers we know as yet next to nothing, and not until it has been ascertained what are the causes and the nature of the changes in the individual feather, can a trustworthy theory be advanced concerning the modifications of the color in the species generally.

As already indicated, the rest of the resident species are widely distributed Circumpolar and North-Palæarctic forms which consequently occur in the neighboring countries as well, and therefore are of little interest in the present connection. A few words only need be said about three of these species. The Raven of Kamtschatka has been separated as peculiar under the name of *Corvus corax kamtschaticus*. Not having seen specimens we are unable to appreciate the alleged differences from the common stock. This may be our fault, or that of the description, but we should not be surprised if the race ultimately should prove to be valid, and only remark that the Raven has not yet been found in Japan proper, specimens having only been obtained in the Kuril Islands. The other species worthy of a few remarks is *Leucosticte brunneonucha*. A bird which has been called by that name is well known from Japan, and the National Museum possesses specimens from Vladivostok, on the Asiatic mainland, on the opposite side of the Japan Sea. It is reported from the Kuril Islands, and also from the eastern coast of the Kamtschatkan Peninsula. The genus *Leucosticte* is Asiatic and American in its distribution, and most of the species show a great

tendency to split up into geographical subspecies or races. We have not had an opportunity of comparing Kamtschatkan specimens with those from more southern localities, and shall therefore abstain from any further remarks beyond calling attention to the importance of having a very careful and minute comparison made, and to the fact that Pallas's "*Passer arctous* var. β, 1" from the Kurils, has not been rediscovered yet. The third species alluded to is *Surnia ulula*, which is not known from Japan. Descriptions of Kamtschatkan specimens indicate some differences, chiefly increased amount of the white color, which may ultimately secure for them recognition as a race.

When now directing our attention to the migratory summer visitors, their distribution and their migration routes, we sadly miss satisfactory information as to the ornis to the north and east of Kamtschatka. Several travelers have collected on the western and northern shores of the Okotsk Sea; but, in the first place, they remained only a short time in a few localities, and there is no special list from that region with sufficient details concerning localities, &c. Still worse is the fact that what scanty information we have is next to worthless. Middendorff and v. Schrenck are the chief collectors in that region, but, unfortunately, they are also the chief sinners in "lumping" allied forms, so that for the solution of questions of this character it is impossible to tell with certainty which forms they had before them, except perhaps in a few cases (cf. later on in regard to the Swallows, p. 347). No example could more strikingly illustrate the deplorable results of that kind of science, and none could more forcibly demonstrate the necessity of those nicer distinctions which ornithologist of the other school, with becoming toleration, have styled "hair-splitting."

Fortunately, the ornis of the country to the south of Kamtschatka is in a better condition, thanks to Capt. Thomas Blakiston's more than twenty years of intelligent collecting and study in Japan. The Kuril Islands, it is true, are still very little known, but also from there we have, through Mr. Blakiston, received much valuable information.

As a matter of course, most of the summer visitors to Kamtschatka occur also in Japan, either breeding, transient, or wintering, and when the specimens from the two countries are absolutely identical it may be safe to assume that the Kamtschatkan birds migrate southward directly to Japan along a route following the Kuril chain of islands. There are, however, a number of species regularly occurring in Kamtschatka as summer visitors which do not pass through Japan on their

way southward. Once in a while a single straggler is likely to be captured in the latter country, but they do not occur there regularly twice a year when going south and north. Nor will the assumption of insufficient observations help us explain the absence of these species from the Japanese fauna, several of the forms being so conspicuous that it is absolutely impossible they could have been overlooked if regularly passing through, as will be seen by an inspection of the table. A few forms, nearly related to species breeding in Japan, may, perhaps, have been overlooked in the latter country, and are therefore in the table indicated by a ? in front of the name.

TABLE XIV.—*Summer visitors to Kamtschatka which do not pass through Japan on their way southward or northward.*

Sterna paradisæa.
?Actodromas temminckii.
Pseudototanus guttifer.
Pavoncella pugnax.
?Cuculus peninsulæ.
Calcarius lapponicus.
Carpodacus erythrinus grebnitskii.
Chelidon tytleri.
?Chelidon kamtschatica.
Lanius cristatus (?)
Erythrosterna albicilla.
Anthus gustavi.
Budytes flavus leucostriatus.
?Phyllopseustes homeyeri.
Cyanecula suecica

It is doubtful whether *Butalis sibirica* should not be included in this list, as it does not seem to be common in Japan. As it has been taken there, however, it has been thought safer to exclude it.

From the above list is also omitted *Emberiza schæniclus*, since we do not know the exact status of the Kamtschatkan birds. Taczanowski assures us that they are typical, but we are nevertheless by no means certain that they do not belong to the form occurring in Japan.

The migration route over the Kuril Islands and Japan seems to be so natural that it is greatly perplexing to find that it is not the only one for all the birds of Southern Kamtschatka going south in autumn and returning north in spring again. But while we are forced to admit that they take another way, the fact is an additional evidence in favor of the theory of comparatively narrow and limited routes.

It is at present impossible to fix the direction of this migration route in general, and we shall indulge in no guess-work.

One species, however, may perhaps be traced part of the way, and may therefore merit detailed consideration, since its history seem to contain some valuable hints. We refer here to *Chelidon tytleri*, which is known from Kamtschatka, Dauria, and India. Messrs. Middendorff

and v. Schrenck usually mix such forms together under one name which we regard as species or subspecies worthy of separate names (*cf.* also the remarks above, on p. 345). So also in the present case, as the eastern *Chelidones* are lumped together as *Hirundo rustica* var. *rufa*. Usually it is nearly impossible to extricate the observations belonging to the different forms, but in this case the difference between *Ch. gutturalis* and *Ch. tytleri* was too great for even v. Schrenck to ignore altogether, though he by no means suspects them of being separable, much less understands the importance of keeping them separate*.

Fortunately his remarks enable us to decide which forms he and Middendorff collected at two very important localities. Speaking of the "*Hirundo rustica* var. *rufa*," which he found throughout the Amur Valley (Reise Amurl. I, p. 387), he observes that it was "much paler than the old male among Middendorff's specimens from Udskij Ostrog, and only slightly darker than the old male of the European Barn Swallow. * * * The black band of the fore neck is only narrow and contains some rusty brown spots."†

This description is quite sufficient for identifying the Amur Valley bird as *Ch. gutturalis*, while on the other hand, the remark plainly shows that the bird Middendorff collected at Udskij Ostrog, at the mouth of the Uda Valley, is *Chelidon tytleri*. This determination is extremely interesting since the valleys of the two rivers Amur and Uda are close together, only being separated by the Bureja Mountains, but the direction of the Amur and Ussuri is southern, while Uda comes from the west. The Stanovoj Mountains, which until this point run close to the shore of the Okotsk Sea, make here a sudden bend to the westward, leading over to Dauria and Transbaikalia. According to Middendorff (Isepiptesen Russl., p. 125) Vossnessenski met "*Hirundo rustica* var. *rufa*" at Ajan. We also know that *Ch. tytleri* is common on the western coast

*That v. Schrenck writing as he did, before the theory of evolution was fairly developed and understood, and before the recent theories of the bird migration, which are so closely connected with the former, had been conceived, is perhaps not so very surprising. That Taczanowski, however, still, in 1883, refuses to recognize the difference between *gutturalis* and *tytleri* (= *saturata*) (*cf.* his foot-note on p. 356, Bull. Soc. Zool. France, 1883, in regard to the latter form), and fails to see the necessity of tracing the geographical distribution of each one separately, is a matter both of surprise and regret.

†"Viel blässer als das alte Männchen unter den Middendorffschen Exemplaren von Udskoi Ostrog, und nur wenig dunkler als das alte Männchen der europäischen Rauchschwalbe. * * * Das schwarze Band der Kropfgegend ist nur schmal und trägt einige rostbraune Flecke."

of Kamtschatka. We know that it does not travel southward over the Kuril Islands and Japan. It seems, then, a pretty safe conclusion, that the Swallow, at least, crosses the Okotsk Sea from some point on the western coast of Kamtschatka, and that when arriving on the opposite coast of the Okotsk Sea it meets the Stanovoj Mountains, it follows the eastern slope of that range southward, turning westward at Udskij Ostrog where the mountains also turn westward.

I have remarked above that this case may offer a hint as to how the other species migrate, which do not pass over Japan. I do not mean to say, however, that the other species probably follow exactly the same route; in fact, I do not intend to propose any theory as to them, since what we know about them is too fragmentary. To illustrate this I may mention *Carpodacus erythrinus grebnitskii*. Middendorff met it at Udskij Ostrog and v. Schrenck in the Amur Valley. But as the species breeds there, it is—with our present knowledge—impossible to say whether the Kamtschatkan individuals migrate along the Uda only, or if they also go by the Amur route. If only the Amur birds had a single character of their own, no matter how slight, no matter how keen and trained the eye of the expert must be to discover it, what an advantage! And still there are people who call the search for such fine distinctions "hair-splitting!" Could we possibly get more forcible examples to illustrate the absolute necessity of diligently practicing this noble art of "hair-splitting" than the above ones of *Chelidon tytleri* and *Carpodacus grebnitskii*?

To the north, or rather the northeast of Kamtschatka, lies a country larger than Great Britain, which is totally unknown, at least as far as its birds are concerned. Roughly speaking, it is situated between 60° and 66° north latitude, and between 195° and 180° west longitude, being the whole river area of the Anadir and its numerous tributaries. Although bordered to the northwest by the northern arm of the Stanovoj Mountains, this vast area is undoubtedly inhabited by a considerable number of Siberian forms of migratory birds, but as we know absolutely nothing of the ornis of the region its relation to that of Kamtschatka can only be guessed at.

Still further to the northeast is the Tschuktschi Peninsula, the ornithology of which is a little better known. We have scattered notes by the many travelers who stopped a few days in Plover Bay. Nordenskiöld, wintering at Pitlekaj, has furnished valuable observations cover-

ing nearly a year. Finally the Russian Transit-of-Venus Expedition brought home a few species of birds from Tschukotskij Noss.

Scanty as this material is, both on account of the limited extent of the explorations and the northern situation of the country (64 to 67° north latitude), it is better than nothing, and will suffice for some interesting observations. It will be necessary first to give a list of the summer visitors of that region, which are of importance in the present connection. We have, consequently, left out all the strictly American forms which in summer visit the Tschuktschi Peninsula.

TABLE XV.—*Palæarctic Summer Visitors (Land Birds and Fluviatile Waders) known to occur on the Tschuktschi Peninsula.*

Arenaria interpres.
Charadrius æquatarola.
dominicus fulvus.
Ægialitis hiaticula (?)
Eurynorhynchus pygmæus.
Eudromias morinellus.
Actodromas acuminatus.
temminckii.
Pelidna ferruginea.*
Calcarius lapponicus.
Anthus gustavi.
japonicus (?)
cervinus.
Budytes flavus leucostriatus.
Motacilla ocularis.
Phyllopseustes borealis.
Turdus iliacus (?)
naumanni (?)
Saxicola œnanthe.

In spite of the meagerness of this list, it confronts us at once with the very important fact that it contains a number of species which have not yet been obtained in Kamtschatka, and most of which, probably, do not occur there regularly, viz:

Ægialitis hiaticula (?)
Eudromias morinellus.
Pelidna ferruginea.
Eurynorhynchus pygmæus.
Motacilla ocularis.
Turdus iliacus (?)
naumanni.
Saxicola œnanthe.

In this connection I wish to recall what I have said previously in this work (p. 283 and p. 303) in regard to *Budytes leucostriatus* and *Phyllopseustes borealis*, viz, that there seems to be a slight difference between the stock inhabiting Alaska (and the opposite shore of Asia) and the one which passes the summer in Kamtschatka, indicating that the former never touches the latter country during their migrations.

* = *Tringa subarquata* GÜLDENST. Brünnich's name has the priority as will be seen from the following list of the chief synonyms:
1764.—*Tringa ferruginea* BRÜNN., Orn. Bor., p. 53.
1775.—*Tringa subarquata* GÜLD., Nov. Comm., Petrop., XIX (p. 471, pl. 18).
1809.—*Numenius pygmæus* BECHST., Naturg. Deutschl., IV, p. 148.
1826.—*Trynga falcinella* PALL., Zoogr. Ross. As., II, p. 188.

We know for certain that none of the above species migrate southward along the American coast, not even those which regularly visit Alaska in summer. They must, therefore, migrate south through some part of Northeastern Asia, since they do not stay near Bering Strait in winter. That all of them should have been overlooked in Kamtschatka is not probable. It may, at least, be taken for granted that they do not regularly pass up and down the eastern coast twice a year.

It is, in this connection, a significant fact that these same birds do not regularly occur in Japan either, with the possible exception of two, viz, the birds which in Table XV are called *Ægialitis hiaticula* and *Turdus naumanni*. The former is not found in Japan; on the other hand, the nearly allied *Ægialitis placida* is common in winter about Yokohama, and the bird which Nordenskiöld brought home from the winter quarters of the "Vega" may have been this species and not the true *hiaticula*. The true *Turdus naumanni* TEMM. is included in the Japanese fauna, but Blakiston and Pryer say that it "does not seem to be abundant." It is to be remarked that Middendorff met this species on the western shore of the Okotsk Sea, at Ajan, and in the Stanovoj Mountains (54½° and 59½° north latitude), but that he erroneously calls it *Turdus ruficollis*.

In regard to *Eurynorhynchus pygmæus* it must be observed that, although several specimens have been obtained in Japan, it is not known to occur there regularly. Still the fact that this bird, in spite of its most extraordinary bill, has escaped notice in other places until recently, makes it less safe to base any conclusions upon the negative evidence of its not having been recorded from a given locality. This species needs close watching everywhere in Eastern Asia, for not only is it a rare and curious bird, but it is confidently expected that considerable light will be thrown upon the migrations of that region when the route of the Spoonbilled Sandpiper shall have been mapped out.

The migratory inhabitants of the Tschuktschi Peninsula, which in fall go south to winter in some part of Eastern or Southern Asia, are most likely to follow the southern coast of the peninsula westward, or to cross the Bay of Anadir, in both cases reaching the great river system of Anadir. A glance at the map will convince us that they do not cross the range of the Stanovoj Mountains, which here separate the Anadir system from that of the Kolima. The direction of this mountain range is southwest, and parallel with it is another mountain sys-

tem along the coast. Between these and in the same direction runs the river, notably the tributary Orlovka. A route following the latter points directly towards Penschinsk at the innermost northeastern corner of the Okotsk Sea. The Stanovoj Mountains, here approaching the coast, bend westward and run parallel with the coast, but at some distance from the sea, as far as Okotsk; but at the latter place, whence the coast bends southwest again, that lofty mountain chain moves out close to the shore. At about 55° north latitude, the mountains again turn westward, the valley of Uda leaning on their southern slope. Since we know that the birds alluded to do not move southward from Penschinsk, through Kamtschatka, and since their escape westward is effectually prevented by the snow-clad Stanovoj Mountains, the route between the mountains and the coast becomes the only available road to the south. Arriving at Udskij, they have the choice of at least two routes.

We shall now take one of the above species as an illustration of the hypothesis here mapped out, selecting for that purpose *Motacilla ocularis*, the Wagtail, with gray back in both sexes and at all seasons. We remark at the outset that one specimen of this species has been taken in Kamtschatka* and another one on Bering Island; but these were evidently stragglers, as was the specimen which was collected by Mr. Belding at La Paz in Lower California. This species is a regular breeding bird on the Tschuktschi Peninsula, and all the various parties which have collected at Plover Bay obtained or observed it. It is true that we know of no authentic record of this species, as distinguished from the other eastern white Wagtails, having been collected at any intermediate point, but from v. Schrenck's description of the specimens which Middendorff collected at Udskij Ostrog it is clear that the latter are true *ocularis*. But there seems to be no other possible way than that indicated above, when the birds do not migrate over Kamtschatka and Japan. From Udskij Ostrog they must follow the same route to Dauria and Baikal which we have indicated on a previous page when discussing the migration of *Chelidon tytleri*. The evidence is that the species is common in the districts just mentioned, while it is missing in the Amur Valley and farther east, it being undoubtedly a black-backed form that occupies the Amur district. This close analogy with

* Mr. Taczanowski now considers his previous identification erroneous, referring the specimen in question to *M. lugens*, with which he wrongly identifies *M. japonica*. *Cf.* Dyb. and Tacz., B. S. Z. F. 1884, Extr., p. 11.

outlying regions where we have made their
for our present purpose to start from the
, the so-called province of Transbaikalia.
extend the limits northward and eastward
rd gradually along the southern slopes of
j Mountains, finally, by degrees, reaching
From here they only had the narrow slip
d the high Stanovoj Mountains, which they
er year the pioneers advanced a little farther
y the swallow reached a latitude beyond which
it to proceed. But a glance at the map (p. 359)
separating it from Kamtschatka is too insignifi-
he swift swallow, which found suitable quarters
the mosquito-ridden peninsula, where it found no
competitor. The wagtail, on the other hand, could
climate better, and pushed on until the outposts
of Berings Strait, across which they will probably
gration before long. That *Motacilla ocularis* in reach-
did not extend southward over the peninsula may be
fact that it found Kamtschatka already occupied by
d *Motacilla lugens*.

occasion I have made the remark that Kamtschatka is
esting on account of the birds it possesses, but, perhaps,
on account of those which are absent from its ornis. To
his more fully we shall undertake a comparison with the avi-
he district at the mouth of the Amur River and at Udskij
iving in a table all the species especially mentioned as col-
v. Schrenck and Middendorff in the former localities, which
d at about the same latitude as Petropaulski, and not known
in Kamtschatka. Such forms are excluded, however, which
egarded as representing each other, as for instance, the corre-
races of *Urogallus*, the different forms of woodpeckers, &c.
tained his nomenclature without any changes, since in many
s difficult to decide, without specimens, the exact name of the
hich he collected.

TABLE XVI.— *Species collected at the Mouth of the Amur River and at Udskij Ostrog, unknown in Kamtschatka.*

Tringa canutus.
crassirostris.
Fulica atra.
Anas galericulata.
Ardea stellaris.
cinerea.
Tetrao bonasia.
canadensis *var.* franklinii (=*falcipennis*).
Columba risoria (accidental at the Lower Amur?).
turtur *var.* gelastis.
Milvus niger *var.* melanotis.
Strix uralensis.
passerina.
bubo.
Alcedo ispida *var.* bengalensis.
Upupa epops.
Yunx torquilla.
Picus martius.
leuconotus.
Alauda alpestris.
Corvus japonensis.
Corvus dauricus.
Garrulus glandarius.
infaustus.
Emberiza pithyornus.
rutila.
personata.
pusilla.
Fringilla spinus.
Passer montanus.
Carpodacus roseus.
Muscicapa cinereo-alba.
luteola.
Lanius phœnicurus (=*Superciliosus.*)
Certhia familiaris.
Cinclus pallasii.
Accentor alpinus.
Phyllopneuste sibirica (= *Oreopneuste fuscata*).
superciliosa.
Regulus cristatus.
Turdus naumanni.
Lusciola erythronota.

It is true that several of the species here enumerated reach their northern limit at the mouths of Amur and Uda, as for instance *Fulica atra*, *Aix galericulata*, *Botaurus stellaris*, *Ardea cinerea*, &c., but it is not less true that the southern part of Kamtschatka is situated fully as far south as the localities mentioned, and that these very species also inhabit Northern Japan.

Still more remarkable is it that several of the species which are common inhabitants of Northern Japan, and which reach a much higher latitude on the western shore of the Okotsk Sea than the mouth of the Uda River, nevertheless characterize the Kamtschatka fauna by their absence.

It is furthermore to be remarked that these missing forms by no [illegible] species of restricted distribution. A glance at the [illegible] following Circumpolar or Palæ-

TABLE XVII.

(may have been overlookcd, how-	Coloeus.
).	Garrulus.
	Perisoreus.
us.	Spinus.
	Passer.
.	Certhia.
.	Cinclus.
.	Accentor.
dium.†	Reguloides.
	Regulus.
is (the occurrence in Japan is doubt-	

a supplement to the above we give the names of a few Circum- and Palæarctic genera (and subgenera) which occur in Northern i without reaching Kamtschatka, viz:

TABLE XVIII.

ps (=*Tachybaptes*).	Coturnix.
us.	Circus.
.	Caprimulgus.
ia.	Sturnus.
ula.	Hirundo (=*Cotile*).
a.	Troglodytes.
ias.	Pratincola.

comparison with the following list of genera which inhabit Kam- tka shows beyond dispute that it is not the severity of the climate excludes most of the above genera, since they are able to stand it s well as members of following groups, which occur there regularly:

TABLE XIX.

bus.	Hypocentor.
ago.	Chloris.
nedula.	Pyrrhula.
ia.	Loxia.
a.	Clivicola.
llus.	Chelidon.
n.	Lanius.
.	Butalis.
is.	Erythrosterna.
nus.	Acrocephalus.
i.	Locustella.
aga.	Ianthia.
	Melodes.

ave included such forms, the reported occurrence of which in Kamtschatka is ely doubtful, since their occurrence on the western shore of the Okotsk Sea ly has in most cases caused the false statement of their being part of the chatkan ornis.

ula is left out, since its reported occurrence in Kamtschatka is by no means bable.

But if it is true then that Table XIX disproves the climate as the cause of the absence of representatives of the genera contained in Tables XVII and XVIII, what can be the reason of such an extraordinary phænomenon?

Evidently we have to look for an explanation in the way by which the peninsula became inhabited. Kamtschatka is one of the most typical and well defined peninsulas on the globe, and the climatological and physical conditions of the part connecting it with the continent are such as to make it a true island, zoologically speaking. Besides, there seems to be reason to assume that it has been a real island at no very distant period. The usual maps, it is true, indicate a high mountain ridge at the narrowest point of the peninsula, connecting the mountains of the latter with the orographical systems on the continent to the north. But I have heard Mr. Kennan, the celebrated traveler, who has traversed those regions in company with the Koriaks, denounce the maps as entirely wrong in that respect. He said that the country at the point in question is flat from sea to sea. From the observations I made on Bering Island, I have evidence that the latter island, at least, has been subject to a considerable rise during recent periods, and there are reasons to believe that this rise of land has taken place in the region generally. Under these suppositions the narrow neck of the peninsula has once been submerged. Looking apart from the connection to the north there is only one regular way by which Kamtschatka can have been invaded by species which do not voluntarily cross wide seas in search for new homes, and this way is by the Kuril Islands from Japan. The character of these islands, however, is such as to form a barrier rather than a highway to all species which need trees and woods as an essential condition for their existence. Besides a glance at Tables XVII and XVIII shows how surprisingly many forms have not availed themselves of extending their limits northwards over the Kurils, to which the treeless nature of these islands is no obstruction. We have seen above that some migrating birds enter Kamtschatka by some other route than from the extreme north or south, a route by which, therefore, the species in all probability have originally invaded the country, but the Table XVII is plain evidence demonstrating that it is not frequented by a great many forms which might reasonably be expected.

This fact of so many birds staying away from a country of the size, climate, and resources possessed by Kamtschatka is not satisfactorily explained by the present isolated position alone. It requires the hy-

pothesis that this isolation has existed since it first began to be inhabited by its present land-ornis, and also that this immigration commenced at no very distant period. The probable cause of this comparatively late colonization, whether due to the country having undergone a glacial period, or whether volcanic phenomena have anything to do with it, is not in our line to discuss, these being questions for the geologists to solve.

That so many of the resident birds have developed into distinct forms is no argument against the theory of a comparatively recent colonization, since all are nearly related to forms inhabiting neighboring countries, and since this specialization is chiefly only an intensification of the general tendency of the birds inhabiting the whole region of which Kamtschatka only forms a province. If considering these facts in connection with the nearly absolute isolation of the forms in question, no assumption of a very long period seems to be needed in explanation.

The question how these residents originally happened to populate the country should, perhaps, be discussed briefly before closing these remarks.

Looking at the absence of many generally distributed northern Circumpolar and Palæarctic forms of the resident ornis, for instance, *Perisoreus*, *Garrulus*, *Certhia*, *Regulus*, *Cinclus*, *Bonasa*, &c., one can hardly escape the impression that those species which now reside permanently in Kamtschatka originally came there accidentally. Like so many other islands Kamtschatka probably owes its resident ornis to storms having blown the first pairs over from countries across the sea. This population has been going on since it first became inhabitable, and continues so even to-day. That explains in a measure the different degree of abundance and specialization, those forms which have only recently made their appearance being less numerous and less modified.

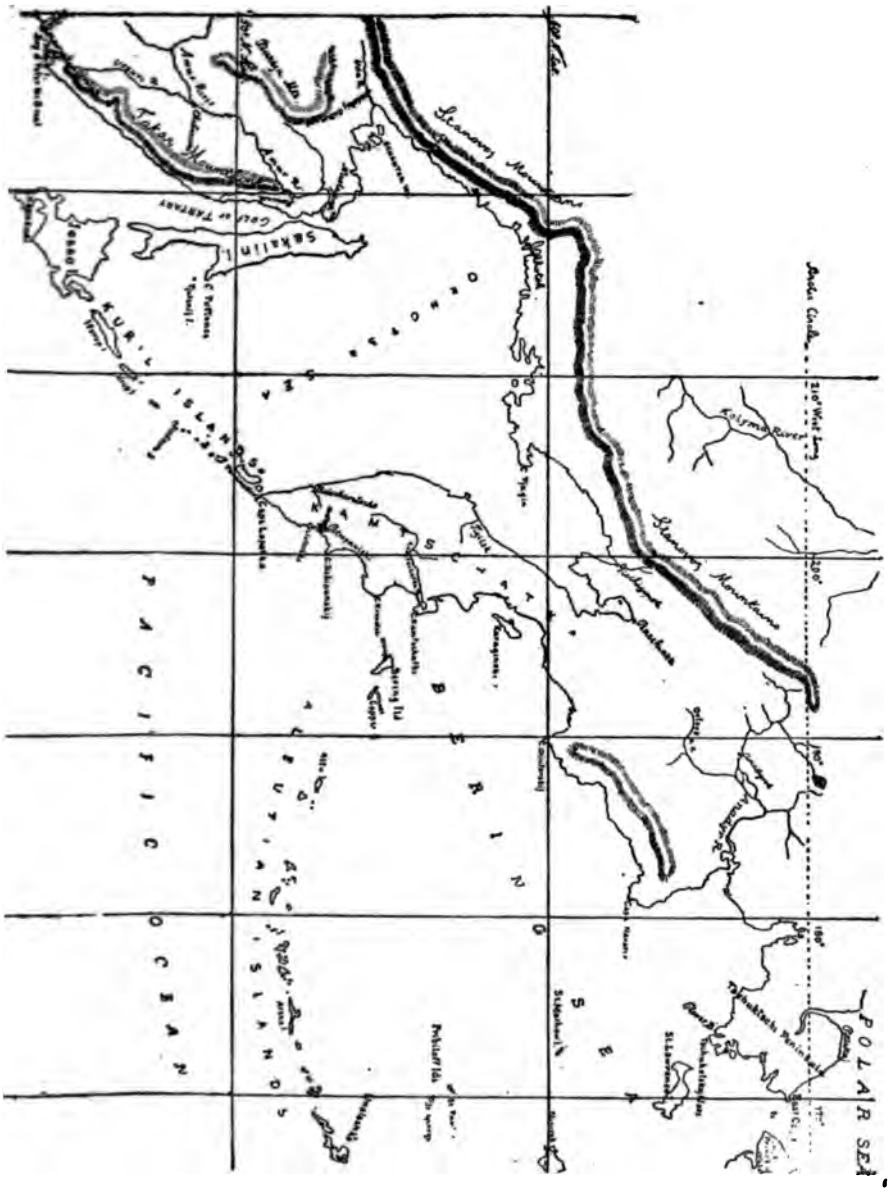
Having now discussed the Kamtschatkan avifauna in its relation to the surrounding countries, the conclusion seems quite justified that the peninsula forms a very well circumscribed ornitho-geographical province, remarkable not only for a number of peculiarly modified forms, but also for a surprising absence of many of the most characteristic forms of the Northern Palæarctic and Circumpolar ornis.

It may finally be interesting to give a condensed comparison with a province of similar size and position at the opposite side of the Palæarctic continent. Great Britain is situated between nearly the same latitudes as Kamtschatka, taking a somewhat similar position on the Atlantic side

as does Kamtschatka on the Pacific. Table XX is intended to show the difference between the two avifaunas. The part relating to the British birds is compiled from the recent list published by the British Ornithologists' Union, with the exclusion of all the species which are enumerated as "occasional and accidental visitors." This category has not been recognized in the Kamtschatkan list, since it is thought that their number is too small to affect the general result.

TABLE XX.

Superfamilies.	Kamtschatka.	British Islands.
Colymboidea	2	3
Alcoidea	17	6
Laroidea	15	16
Procellaroidea	5	4
Scolopacoidea	28	29
Gruoidea	1	5
Anatoidea	29	27
Ardeoidea	0	1
Phalacrocoracoidea	2	3
Tetraonoidea	3	8
Columboidea	0	4
Accipitroidea	12	14
Strigoidea	3	4
Cuculoidea	2	1
Alcedinoidea	0	1
Picoidea	3	4
Caprimulgoidea	0	1
Micropodoidea	1	1
Passeroidea	52	79
	175	211



SKETCH MAP OF KAMTSCHATKA AND ADJACENT COUNTRIES.

REMARKS. — Only those mountains are represented, which are mentioned in the third part of this work.

LIST OF ILLUSTRATIONS.

[All the figures are natural size unless otherwise stated.]

1.—PLATES.

PLATE I.

FIG. 1. *Lunda cirrhata*, ♀ ad., summer. U. S. Nat. Mus. No. 89087; Bering Island, May 11, 1882.

FIG. 2. *Lunda cirrhata*, ♂ ad., winter. U. S. Nat. Mus. No. 92920; Bering Island, January 19, 1883.

PLATE II.

FIG. 1. *Lunda cirrhata*, pullus. U. S. Nat. Mus. No. 92929; Bering Island, September 6, 1883.

FIG. 2. *Lunda cirrhata*, juv. U. S. Nat. Mus. No. 92930; Bering Island, September 24, 1882.

FIG. 3. *Lunda cirrhata*, juv., winter. Bering Island, February 24, 1883.

FIG. 4. *Lunda cirrhata*, jun., winter. U. S. Nat. Mus. No. 92922; Bering Island, February 12, 1883.

PLATE III.

FIG. 1. *Fratercula corniculata*, ♀ ad., summer. U. S. Nat. Mus. No. 89089; Bering Island, May 21, 1882.

FIG. 2. *Fratercula corniculata*, ad., winter. Bering Island, February 24, 1883.

FIG. 3. *Fratercula corniculata*, ♂ jun., winter. U. S. Nat. Mus. No. 92932; Bering Island, February 24, 1883.

PLATE IV.

FIG. 1. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92960; Bering Island, December 29, 1882.

FIG. 2. *Simorhynchus pygmæus*, ♀ ad., summer. U. S. Nat. Mus. No. 92972; Bering Island, May 6, 1883.

FIG. 3. *Simorhynchus pusillus*, ♂ ad., summer. U. S. Nat. Mus. No. 92980; Bering Island, December 30, 1882.

FIG. 4. *Simorhynchus cristatellus*, ♀ ad., summer. U. S. Nat. Mus. No. 89096; Bering Island, May 16, 1882.

FIG. 5. *Simorhynchus cristatellus*, ♀ ad., winter. U. S. Nat. Mus. No. 92958; Bering Island, March 1, 1883.

FIG. 6. *Cyclorrhynchus psittaculus*, ♀ ad., summer. U. S. Nat. Mus. No. 92946; Bering Island, May 9, 1883.

PLATE V.

FIG. 1. *Cyclorrhynchus psittaculus*, ♀ ad., summer. U. S. Nat. Mus. No. 89095; Bering Island, July 11, 1882. For explanation of letters see p. 41.

FIG. 2. *Simorhynchus cristatellus*, ♂ ad., summer. U. S. Nat. Mus. No. 92954; Bering Island, June 4, 1883. Mouth opened to show the outline of the rictus.

FIG. 3. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92960; Bering Island, December 29, 1882. Head seen from behind to show the position of the lateral crests.

PLATE V.—Continued.

FIG. 4. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92970; Bering Island, January 16, 1883. Mouth opened for comparison with Fig. 2.

FIG. 5. *Simorhynchus pusillus*, ♂ ad., winter. U. S. Nat. Mus. No. 92980; Bering Island, December 30, 1882. Bill from above.

FIG. 6. *Synthliboramphus antiquus*, ♂ ad. U. S. Nat. Mus. No. 92985; Bering Island, January 3, 1883.

FIG. 7. Same specimen. Bill from above.

PLATE VI.

FIG. 1. *Fulmarus glacialis glupischa*, ♂ ad., white phase, winter. U. S. Nat. Mus. No. 92906; Bering Island, February 7, 1883.

FIG. 2. *Fulmarus glacialis glupischa*, ad., dark phase, summer. U. S. Nat. Mus. No. 92910; Bering Island, May 4, 1883.

FIG. 3. *Larus schistisagus*, ♂ ad. U. S. Nat. Mus. No. 92885; Bering Island, May 5, 1883.

FIG. 4. *Larus kamtschatchensis*, ♂ ad. U. S. Nat. Mus. No. 92889; Bering Island, May 21, 1883.

PLATE VII.

FIG. 1. *Anser segetum middendorffi*, ♂ ad. U. S. Nat. Mus. No. 92824; Bering Island, May 10, 1883.

FIG. 2. *Anser albifrons gambeli*, ♀ ad. U. S. Nat. Mus. No. 92826; Bering Island, May 10, 1883.

FIG. 3. *Somateria v-nigra*, ♂ ad. U. S. Nat. Mus. No. 92848; Copper Island, July 3, 1883.

PLATE VIII.

FIG. 1. *Phalacrocorax pelagicus*, ♀ ad. U. S. Nat. Mus. No. 92833; Bering Island, April 26, 1883.

FIG. 2. *Phalacrocorax urile*, ♂ ad. U. S. Nat. Mus. No. 92877; Copper Island, July 14, 1883.

FIG. 3. *Phalacrocorax urile*, juv. U. S. Nat. Mus. No. 92878; Copper Island, July 25, 1883.

2.—CUTS.

	Page.
FIG. 1. *Lunda cirrhata*, jun. Copper Island, July 30, 1883	52
FIG. 2. *Lunda cirrhata*, ♀ jun. Bering Island, June 4, 1883. U. S. Nat. Mus. No. 92921	52
FIG. 3. *Larus cachinnans*, ad. Three first primaries, ½ nat. size	69
FIG. 4. *Larus schistisagus*, ad. Type specimen. Three first primaries, ½ nat. size*	70
FIG. 5. *Larus marinus*, ad. Three first primaries, ½ nat. size	71
FIG. 6. *Charitonetta albeola*, ♂ ad. Bering Island, January 19, 1883	165
FIG. 7. *Clangula clangula*, ♂ jun. Bering Island, November 29, 1882	165
Sketch map of Kamtschatka and adjacent countries	359

* The "mirror" of the third primary is larger and whiter than shown in the figure!

INDEX.

A. Page.

Acanthis canescens 258, 259
exilipes 258, 260, 261
holbœllii 256
hornemannii 258
exilipes 258, 322, 337, 341
innominatus 252
intermedius 256
linaria 56, 252, 322, 336
holbœllii 256, 322, 336
pallescens 259
rostrata 259
Accentor alpinus 354
Accipiter astur 319
gyrfalco 204
haliætus 219
lagopus 208
nisus 320, 337
accipitrina (Strix) 220
accipitrinus (Asio) 220, 320, 336
Acrocephalus dybowskii 299, 300
ochotensis 299, 301, 324, 338
Actitis hypoleucos 131, 137, 317, 337
incanus 132
pulverulentus 137
Actodromas acuminatus 115, 117, 316, 338, 349
damacensis 116, 117, 118, 316, 338
fusicollis 121
ruficollis 117, 118, 316, 338
subminutus 116
temminckii 116, 117, 119, 316, 337, 346, 349
acuminata (Tringa) 115
acuminatus (Actodromas) 115, 117, 316, 338, 349
(Totanus) 115
acuta (Anas) 153
(Dafila) 153, 318, 336
adamsii (Colymbus) 14
(Colymbus torquatus) 14
(Urinator) 14, 313, 336
Ægialites mongolicus 106
Ægialitis hiaticula 109, 349, 350
mongola 105, 316, 337
ruficapilla 106
placida 350
semipalmata 109
Ægiothus borealis 258
canescens exilipes 258
exilipes 258
fuscescens 256
linaria 252
exilipes 258
Ægithalos caudatus 324, 337, 343

Page.

ægocephala melanuroides (Limosa) 316, 338
ægolius (Strix) 221
æolus (Phalacrocorax) 187
æquinoctialis (Procellaria) 96
affinis (Aythya) 161
(Charadrius) 105
(Larus) 68, 73, 314
mariloides (Aythya) 161
(Podiceps) 11
(Totanus) 130
agilis (Anthus) 278
(Pipastes) 275, 276
Aix galericulata 354
alascensis (Troglodytes) 293, 294, 296
Alauda alpestris 354
arvensis 234, 235, 236
blakistoni 234
cantarella 234, 235, 236
coelipeta 234
coelivox 234, 235, 236
intermedia 234, 235, 236
japonica 234, 235, 236
alba (Gavia) 315, 336, 340
(Guara) 129
lugens (Motacilla) 284, 287
(Motacilla) 292, 324
albatrus (Diomedea) 89, 316, 337, 340
albellus (Mergus) 178, 318, 337
(Mergellus) 179
albeola (Anas) 166
(Bucephala) 166
camtschatcæ (Motacilla) 287
camtschatica (Motacilla) 287
(Charitonetta) 165, 166, 318, 336
(Clangula) 166
(Motacilla) 287
albescens (Tringa) 118
albicilla (Aquila) 216, 320
borealis (Haliæetus) 209
(Erythrosterna) 273, 323, 338, 346
(Falco) 216
(Haliæetus) 214, 216, 217, 320, 337
hypoleucus (Haliaëtus) 213, 214
(Muscicapa) 273
albidior (Picoides) 321, 338, 342
albifrons (Anser) 145, 146, 317
gambeli (Anser) 145, 317, 337, 341
(Sitta) 324, 338, 342
albigularis (Bonasa) 319
albus (Falco islandus) 204
(Lagopus) 194, 195
(Tetrao) 194

Page.

Alca antiqua ... 23
arctica β ... 59
carbo ... 22
cirrhata ... 43
cristata ... 33
cristatella ... 32
kamtschatica ... 25
psittacula ... 38
tetracula ... 33, 38
Alcedo ispida bengalensis ... 354
aleutica (Sterna) ... 84
aleuticus (Phaleris) ... 38
(Ptychoramphus) ... 27, 314
alicise (Hylocichla) ... 325
alpina americana (Pelidna) ... 120
(Tringa) ... 120, 121
pacifica (Pelidna) ... 120, 121, 316, 337, 341
(Pelidna) ... 120
(Scolopax) ... 120
(Tringa) ... 120
alpinus (Accentor) ... 354
(Lagopus) ... 194, 319
americana (Anas) ... 158
(Euspiza) ... 244
(Hirundo) ... 269
(Mareca) ... 158, 318, 336
(Oidemia) ... 174, 318, 341
(Pelidna) ... 120
(Pelidna alpina) ... 120
(Spiza) ... 244
(Tringa alpina) ... 120, 121
americanus (Cygnus) ... 150
(Merganser) ... 177
(Mergus merganser) ... 331
(Olor) ... 150
amœna (Emberiza) ... 244
Ampelis garrulus ... 323, 336
amurensis (Motacilla) ... 287, 289
Anas acuta ... 153
albeola ... 166
americana ... 158
bernicla ... 149
boschas ... 152, 155, 318, 336
carbo ... 176
caudacuta ... 153
circia ... 156
clangula ... 163
clypeata ... 159
columbianus ... 150
crecca ... 155
cristata ... 160
colymbis ... 160
cygnus ... 149
dispar ... 171
falcaria ... 157
falcata ... 156, 318
fuligula ... 160
fusca ... 174, 176
galericulata ... 354
glacialis ... 169
glaucion ... 163
histrionica ... 166
histrionis ... 166
hyemalis ... 163, 169
marila ... 160
minuta ... 166

Anas mollissima ... 178
nigra ... 178
olor ... 149
penelope ... 157
querquedula ... 156
stelleri ... 170
Anorthura pallescens ... 292
Anser albifrons ... 145, 146, 317
gambeli ... 145, 317, 337, 341
brachyrhynchus ... 145
brenta ... 149
canadensis ... 147
erythropus ... 145, 146
hutchinsii ... 147
hyperboreus ... 317
gambeli ... 145, 146
grandis ... 141, 142, 144
leucopareius ... 147
middendorffi ... 141
nigricans ... 149
segetum ... 141, 144, 317
arvensis ... 141
serrirostris ... 141, 144
middendorffi ... 141, 144, 317, 338, 341
antiqua (Alca) ... 23
(Brachyrhamphus) ... 23
antiquus (Synthliboramphus) ... 23, 314, 337, 340
Anthus agilis ... 278
arboreus ... 274, 278, 338
batchianensis ... 274
blackistoni ... 338
cervinus ... 274, 322, 337, 340
gustavi ... 274, 276, 278, 323, 337, 346, 340
japonicus ... 275, 323, 338, 340
ludovicianus ... 277, 332
maculatus ... 278
pratensis ... 226
seebohmi ... 274, 276
stejnegeri ... 275, 276
Aquila albicilla ... 216, 330
chrysaëtos ... 330, 329, 336
clanga ... 330
lagopus ... 208
leucocephalus ... 209
nobilis ... 220, 339
ossifraga ... 217
pelagica ... 209, 217, 330
arboreus (Anthus) ... 274, 278, 338
Archibuteo ferrugineus ... 329
lagopus ... 208, 330, 329, 336
ferrugineus ... 339
sancti-johannis ... 208
arctica (Alca) ... 59
(Fratercula) ... 45, 46, 59, 61, 62
(Lunda) ... 59
(Sterna) ... 85
arcticus (Colymbus) ... 313
(Falco) ... 208
(Urinator) ... 313, 336
arctous (Passer) ... 265, 345
Ardea cinerea ... 254
stellaris ... 254
arenaria (Calidris) ... 122, 316, 336
Arenaria interpres ... 102, 316, 336, 340
melanocephala ... 102
arenaria (Tringa) ... 122

Page.

ans (Larus)..... 67, 68
..... 66, 72
)..... 317
.....112, 316, 317, 341
ia..... 112
emis..... 112, 113
) 112
..... 17
..... 17
ag)..... 18
ria).. 18
.....17, 20, 21, 54, 95
.....17, 62, 314, 337, 340
nicola)..... 322
.....234, 235, 236
retum)..... 141
..... 320, 336
..... 320
..... 319
..... 319, 320
is....216, 319, 320, 329, 338, 342, 343
.....319, 320, 329
.....324, 337, 342
.....129, 317, 337
s rupestris)..... 195
..... 15, 354
..... 319, 320
nius)..... 138
..... 77
Charadrius)..... 104
)..... 244, 322
..... 244
tor)..... 244, 322, 337
)..... .....14, 313, 336
..... 14
..... 13, 14
arus)..... 325
is)..... 317
..... 115
ocea)..... 122
..... 161
..... 161
..... 318
.....160, 318, 337
.....160, 161, 318, 337
rctica..... 161

B.

opus)..... 102
do) 330
lo rustica).. 330
..... 232, 298
alis (Motacilla)..... 285
..... 187
..... 320
..... 122
hus)..... 274
..... 122
pponica).....122, 316, 338
rus)..... 237, 322, 336
rus corax) 237, 238
o ispida)..... 354
lytes troglodytes)..... 295
..... 149
gricans 149

Page.

Bernicla hutchinsii..... 147, 148
leucopareia..... 147
nigricans 149
torquata..... 149
betularum (Linaria)..... 253, 255
bewickii (Olor)..... 150, 151
bicristatus (Carbo)..... 187
(Graculus)..... 181, 187
(Phalacrocorax) 181, 187
bifasciata (Loxia)..... 323
blakistoni (Alauda)..... 284
(Anthus)..... 323
(Motacilla) 287, 289, 290
boarula (Motacilla)..... 284
Bombycilla garrula 323
bonapartei (Tringa) 121
Bonasa albigularis..... 319
griseiventris..... 319
umbellus..... 112
bonasia (Tetrao)..... 354
borealis (Ægiothus)..... 258
(Colymbus)..... 15
(Cuculus)..... 224
(Cuculus canorus)..... 225
(Dryobates minor) 233
(Haliæetus albicilla)..... 209
(Hirundo)..... 323, 330
(Hirundo rustica)..... 330
kennicotti (Phyllopseutes). 303
(Larus) 62, 66, 67, 315
(Phyllopneuste)..... 302
(Phyllopseustes).. 302, 304, 305, 325, 337, 349
(Phylloscopus) 302
(Pica pica)..... 242
(Poecilia)..... 298
xanthodryas (Phyllopseustes).... 306
boschas (Anas) 152, 155, 318, 336
Botaurus stellaris 354
brachiura (Diomedea)..... 89, 90
Brachyotus cassinii..... 221
brachyotus (Otus)..... 220, 329
Brachyotus palustris..... 221
brachyotus (Strix)..... 220
brachypterus (Brachyramphus) 23
Brachyramphus brachypterus..... 23
kittlitzii 314, 331, 337, 340
marmoratus.....314, 337, 340
antiqua..... 23
brachyrhynchus (Anser)..... 145
(Larus) 78, 79, 80, 82
Branta canadensis hutchinsii.....147, 318, 337, 341
leucopareia..... 147
minima..... 147
nigricans 149, 318, 337, 341
occidentalis 147, 148
brenta (Anser)..... 149
nigricans (Bernicla) 149
brevipes (Heteractitis).....132, 133, 134, 135, 136, 137, 317, 338
(Heteroscelus) 132
(Totanus)..... 137
(Tringa)..... 132
brevirostris (Larus).....78, 79, 80, 82
(Rissa).....82, 83, 315, 337, 340
brünnichii (Uria)..... 17, 20
brunneicephalus (Larus)..... 77

Page.

brunneinucha (Leucosticte) 261, 262
brunneonucha (Fringilla) 322
(Leucosticte) 262, 322, 338, 344
bubo (Strix) 354
Bucephala albeola 166
clangula 163
Budytes citreolus 324
flavus 280, 282
flavus leucostriatus ... 280, 282, 303, 324, 338, 346, 349
leucostria 280
leucostriatus 280
novæ-guineæ 284
buffonii (Lestris) 87
(Stercorarius) 87
burka (Gallinago) 110
Butalis sibirica 272, 323, 338, 346

C.

cachinnans (Larus) 67, 72, 315, 337, 340
(Larus argentatus) 67, 68
cærulecula (Cyanecula) 325
cahirica (Chelidon) 270
Calamodyta ochotensis 299
Calamophilus sibiricus 324
calcarata (Fringilla) 250
calcaratus (Passer) 250
(Plectrophanes) 250
Calidris arenaria 122, 316, 336
calidris (Charadrius) 122
Calcarius lapponicus 250, 277, 322, 336, 346, 349
californica (Lomvia troile) 20
(Uria) 20, 21, 25
(Uria troile) 18, 20, 314, 337, 340
californicus (Larus) 73, 74, 75
(Catarractes) 20
Calliope camtschatkensis 310
calliope (Erithacus) 309
(Lusciola) 309
(Melodes) 309, 325, 338
(Motacilla) 309
(Sylvia) 309, 325
Calobates melanope 283
melanops 283
camtschatcæ (Motacilla albeola) 287
camtschatica (Motacilla albeola) 287
(Phaleris) 25
(Pica) 241, 322, 338, 342
(Pica pica) 242
(Sterna) 83, 315, 338, 341
camtschaticus (Simorhynchus) 25
(Tetrao) 192
camtschatkensis (Calliope) 310
(Parus palustris) 298
(Turdus) 310
cana (Uria) 23
canadensis (Anser) 147
hutchinsii (Branta) 147, 318, 337, 341
franklinii (Tetrao) 354
candicans (Falco) 204
(Falco gyrfalco) 205
(Falco islandicus) 205
gyrfalco (Falco) 203
(Hierofalco) 205
(Hierofalco gyrfalco) 205

Pa

candicans islandicus (Falco) .....
candidissimus (Astur) .216, 319, 330, 329, 338, 342,
canescens (Acanthis) .....
(Cannabina) .....
exilipes (Ægiothus) .....
(Fringilla linaria) .....
Cannabina canescens .....
canogularis (Podiceps) .....
canorinus (Cuculus) 234, 235, 237,
canoroides (Cuculus) 235,
canorus borealis (Cuculus) .....
(Cuculus) 234, 235, 236
indicus (Cuculus) .....
telephonus (Cuculus) 234, 237, 331,
cantarella (Alauda) 234, 235
canus (Larus) 74, 76, 315, 337
major (Larus) .....
canutus (Tringa) .....
capistratus (Chroicocephalus) .....
(Larus) .....
carbo (Alca) .....
(Anas) .....
Carbo bicristatus .....
carbo (Cepphus) 22, 314, 337
Carbo pelagicus .....
carbo (Phalacrocorax) .....
(Uria) .....
Carbo urile .....
carbonarius (Parus) .....
Carduelis kawariba .....
carinata (Fratercula) .....
carnivorus (Corvus corax) .....
carolinensis (Pandion haliætus) .....
Carpodacus erythreus .....
erythrinus .....
grebnitskii 265, 322, 346
roseus .....
caryocatactes (Corvus) .....
(Nucifraga) 331
caspia (Sterna) .....
cassinii (Brachyotus) .....
cassini (Simorhynchus) 2
castor (Mergus) .....
Catarractes parasita .....
californicus .....
caudacuta (Anas) .....
caudata (Mecistura) .....
(Pica) .....
caudatus (Ægithalos) 334, 337
Centrophanes lapponicus .....
Cepphus arra 1
carbo 22, 314, 337
columba 21, 314, 337
grylle .....
cepphus (Lestris) .....
Cepphus lomvia .....
mandtii .....
septentrionalis .....
cepphus (Stercorarius) .....
Cerorhinca monocerata 89, 314, 331, 337,
occidentalis .....
Certhia familiaris .....
certhiola (Sylvia) .....
cervina (Motacilla) .....
cervinus (Anthus) 324, 338, 337,

Page.

chalcopterus (Larus) 64
Charadrius affinis 105
suratus orientalis 104
calidris 122
cinctus 102
dominicus 105
fulvus..104, 105, 316, 337, 349
fulvus 104
hypomelanus 104
longipes 104
mongolicus 104, 106
mongolus 105
pardela 104
pluvialis 104
squatarola 103, 316, 336, 349
virginianus 104
virginius 104
Charitonetta albeola 165, 166, 318, 336
Chaulelasmus streperus 331
Chelidon cahirica 270
erythrogaster 269
erythrogastra 269, 271, 272
gutturalis 270, 271, 347
kamtschatica 323, 330, 338, 346
rustica 269, 272
tytleri ...269, 271, 323, 330, 336, 346, 347, 348, 351, 352
Chen hyperboreus 317, 336
Chimerina cornuta 314
chinensis (Diomedea) 89, 90
(Tringa) 120
(Tringa cinclus) 120
chloris (Coccothraustes) 265
Chloris kawarahiba 265, 322, 338
chloris (Sylvia) 302
Chlorospiza kawarahiba 265
kawariba 265
Chroicocephalus capistratus 77
ridibundus 76
chrysaëtos (Aquila) 320, 329, 336
chrysolaus (Turdus) 325, 330
Cicaronia microceros 35
pusilla 35, 39
cinclus (Charadrius) 102
chinensis (Tringa) 120
Cinclus pallasii 324, 354
cinclus (Sturnus) 324
(Tringa) 116, 119, 120, 316
cinerascens (Phalaropus) 139
cinerea (Ardea) 354
(Clivicola riparia) 268
(Limosa) 132
(Scolopax) 132
(Terekia) 125, 132, 317, 337
cinereo-alba (Muscicapa) 272, 354
cinereus (Phalaropus) 139
circia (Anas) 156
(Querquedula) 156
cirrhata (Alca) 43
(Fratercula) 44
(Lunda) 19, 21, 26, 28, 31, 43, 45, 46, 47, 48, 57, 61, 62, 95, 314, 337, 340
cirrhatum (Mormon) 43
cirrhocephalus (Mergulus) 23
cirrhis (Picus) 321
cisaa (Dryobates) 230

Page.

citreolus (Budytes) 324
citrinella (Motacilla) 324
clanga (Aquila) 320
Clangula albeola 166
clangula (Anas) 165
(Bucephala) 163
Clangula clangula 163, 165, 318, 337
clangula (Clangula) 163, 165, 318, 337
(Fuligula) 163
Clangula glaucion 163, 172
clangula (Glaucion) 163
Clangula histrionica 166
islandica 164
torquata 166
Clivicola riparia 267, 323, 337
cinerea 268
clypeata (Anas) 159
(Rhynchaspis) 159
(Spatula) 159, 318, 336
Coccothraustes chloris 265
coccothraustes 322, 337
coccothraustes (Coccothraustes) 322, 337
Coccothraustes vulgaris 322
coelestis (Scolopax) 110
coelipeta (Alauda) 234
coelivox (Alauda) 234, 235, 236
collaris (Morinella) 102
colonorum (Corvus) 239
columba (Cepphus) 21, 314, 337, 340
Columba risoria 354
turtur gelastis 354
columba (Uria) 21
columbianus (Anas) 150
(Olor) 150, 151, 318, 336
colymbis (Anas) 160
Colymbus adamsii 14
arcticus 313
auritus 14, 313, 336
borealis 15
cornutus 14
cucullatus 11, 13
glacialis 14, 16
grisegena 11, 13
grisegena holbœllii 13
hiemalis 14
holbœllii 11, 313, 337, 341
immer 16
longirostris 12
lumme 15
microrhynchos 16
mülleri 16
nigricollis 12
parotis 13
rubricollis 13
rufogularis 16
salvadorii 13
septentrionalis 15
stellaris 16
stellatus 15
striatus 16
suberistatus 13
torquatus var. adamsii 14
communis pealei (Falco) 206
consul (Larus) 64
cooperi (Podiceps) 11
corax behringianus (Corvus) 237, 238

Page.

corax carniverus (Corvus) 237
(Corvus) 237, 239, 321, 337
kamtschaticus (Corvus) 321, 344
corniculata (Fratercula) 27, 43, 48, 59, 61, 95, 314, 337, 340
(Mormon) 59
(Phaleris) 35
cornix (Corvus) 239
cornuta (Chimerina) 314
cornutus (Colymbus) 14
(Podiceps) 14
corone (Corvus) 239
levaillantii (Corvus) 239, 322, 338
Corvus behringianus 237, 322, 336
caryocatactes 321
colonorum 239
corax 237, 239, 321, 337
behringianus 237, 238
carnivorus 237
kamtschaticus 321, 344
cornix 239
corone 239
levaillantii 239, 322, 338
culminatus 239, 240
dauricus 354
glandarius 322
grebnitskii 237
japonensis 239, 240, 354
japonicus 239
levaillantii 239
orientalis 239, 240
pica 241
sinensis 239
Corydalla gustavi 274
Corythus enucleator 322
kamtschatkensis 322
Cotyle riparia 267
couesi (Arquatella) 112, 316, 337, 341
crassirostris (Tringa) 112, 115, 354
crecca (Anas) 155
(Nettion) 155, 318, 337
(Querquedula) 155

Cuculus canorus 224, 225, 22
borealis 22
indicus 22
telephonus 224, 227, 32
himalayanus 22
indicus 22
kelungensis 225, 22
micropterus 22
peninsulæ 227, 228, 321, 33
saturatus kelungensis 22
striatus 224
swinhoei 224
telephonus 224, 22
culminatus (Corvus) 239
curilica (Procellaria) 31
curilicus (Puffinus) 31
cutberti (Somateria) 15
Cyanecula cærulecula 32
suecica 325, 33
Cyanocitta stelleri 32
cyanopus (Numenius) 317
cyanura (Ianthia) 303, 325
(Lusciola) 32
(Motacilla) 32
(Nemura) 32
(Sylvia) 32
cyanurus (Tarsiger) 32
Cyclorrhynchus psittaculus 38, 39, 314, 33
cygnoides (Cygnopsis) 318, 33
Cygnopsis cygnoides 318, 33
Cygnus americanus 31
cygnus (Anas) 31
Cygnus musicus 31
olor 31
cygnus (Olor) 149, 150, 152, 31
Cymochorea leucorhoa 31
melania 31
Cypselus pacificus 31

D.

Page.

Dryobates leucotus ... 321
major ... 230
minor borealis ... 233
hortorum ... 233
immaculatus ... 233
pipra ... 232
immaculatus ... 233
purus ... 230, 321, 338, 342
Dryocopus martius ... 321
Dryopicus martius ... 321
dubia (Uria) ... 33
dubius (Turdus) ... 307
dybowskii (Acrocephalus) ... 299, 300
Dytes auritus ... 14

E.

Emberiza americana ... 244
amœna ... 244
aureola ... 244, 322
nivalis ... 248
personata ... 354
pithyornus ... 354
pusilla ... 354
rustica ... 246
rutila ... 354
schoenicius ... 322, 337, 346
variabilis ... 247
Eniconetta stelleri ... 170, 318, 336, 340
esuciator (Corythus) ... 322
kamtschatkensis (Corythus) ... 322
(Loxia) ... 322
(Pinicola) ... 322, 336
epops (Upupa) ... 354
eremita (Tetrao) ... 193
Erithacus calliope ... 309
erythreus (Carpodacus) ... 265
erythrina (Fringilla) ... 265
(Loxia) ... 265
(Pyrrhula) ... 265
erythrinus (Carpodacus) ... 265
grebnitskii (Carpodacus) ... 265, 322, 338, 346, 348
erythrogastra (Chelidon) ... 269, 271, 272
(Hirundo) ... 269
erythronota (Lusciola) ... 354
erythropus (Anser) ... 145, 146
Erythrosterna albicilla ... 273, 323, 338, 346
leucura ... 274
mugimaki ... 274
Eudromias mongolicus ... 106
morinellus ... 109, 349
Eudytes septentrionalis ... 16
Eunetta falcata ... 156, 318, 338, 341
formosa ... 318, 338, 341
eunomus (Turdus) ... 307, 325, 338
Eurynorhynchus pygmæus ... 349, 350
Euspiza aureola ... 244
variabilis ... 247
eversmanni (Sylvia) ... 302
exilipes (Acanthis) ... 253, 260, 261
(Acanthis hornemanni) ... 258, 322, 337, 341
(Ægiothus) ... 258
(Ægiothus canescens) ... 258
(Ægiothus linaria) ... 258

F.

falcaria (Anas) ... 157
(Querquedula) ... 157
falcata (Anas) ... 156, 318
(Eunetta) ... 156, 318, 338, 341
(Mareca) ... 156
(Nettion) ... 156
(Querquedula) ... 156
falcinella (Trynga) ... 349
Falcipennis falcipennis ... 319
falcipennis (Falcipennis) ... 319
Falco albicilla ... 216
arcticus ... 203
candicans ... 204
gyrfalco ... 203
islandicus ... 203
communis pealei ... 206
fuscus ... 203
groenlandicus ... 203, 205
gyrfalco ... 203, 204, 206
candicans ... 203, 205
groenlandicus ... 203
islandicus ... 203
halisætus ... 219, 320
holbœlli ... 203
imperator ... 217
islandicus ... 203
candicans ... 205
islandus ... 203, 204, 319, 336
albus ... 204
fuscus ... 203
maculatus ... 204
lagopus ... 208
leucocephalus ... 209
leucopterus ... 217
pealei ... 206, 319, 329, 336
peregrinus ... 319, 329, 337
pealei ... 206
polyagrus ... 206
rusticolus ... 203, 204, 319, 336
subbuteo ... 319, 337
familiaris (Certhia) ... 354
ferina (Aythya) ... 318
ferruginea (Pelidna) ... 349
(Tringa) ... 349
ferrugineus (Archibuteo) ... 329
(Archibuteo lagopus) ... 329
fissipes (Sterna) ... 316
flammula (Pinicola) ... 322
flava (Motacilla) ... 280
flaveola (Motacilla) ... 280
flavus (Budytes) ... 280, 282
leucostriatus (Budytes) ... 280, 282, 303, 324, 328, 346, 349
formosa (Eunetta) ... 318, 338, 341
foxii (Limosa) ... 122
franklinii (Tetrao canadensis) ... 354
Fratercula arctica ... 45, 46, 59, 61, 62
carinata ... 44
cirrhata ... 44
corniculata ... 27, 43, 45, 59, 95, 314, 337, 340
glacialis ... 59
Fringilla brunneonucha ... 322
calcarata ... 250
erythrina ... 265

Page.

Fringilla griseonucha 261
kawarahiba 265
kawariba 265
lapponica 250
linaria 252
canescens 258
montifringilla 264, 322, 337
spinus 354
Fulica atra 15, 354
fulicaria (Tringa) 140
fulicarius (Crymophilus) 140, 317, 336
(Phalaropus) 140
fuliginosus (Totanus) 132, 134
fuligula (Anas) 160
(Aythya) 160, 318, 337
Fuligula clangula 163
cristata 160
histrionica 166
marila 160
fuligula (Platypus) 160
Fulix cristata 160
marila 160
Fulmarus glacialis 91, 94
glupischa 91, 316, 337, 340
minor 94
rodgersii 94
glupischa 19
pacificus 91
fulvus (Charadrius) 104
(Charadrius dominicus) 104, 316, 337, 349
fumigatus (Troglodytes) 292, 293, 296
furcata (Oceanodroma) 31, 97, 98, 316, 337, 340
(Procellaria) 98
(Thalassidroma) 98
fusca (Anas) 174, 176
(Melanetta) 174
(Oidemia) 175, 176
(Scolopax) 129
fuscata (Oreopneuste) 354
fuscatus (Turdus) 307
fuscedula (Muscicapa) 272
fuscescens (Ægiothus) 256
(Larus) 67, 68
fuscicollis (Actodromas) 121
(Tringa) 121
fuscus (Falco) 203
(Falco islandus) 203
(Larus) 62
(Totanus) 129

G.

galericulata (Aix) 355
(Anas) 354
Gallinago burka 110
gallinago 110, 114, 316, 337
gallinago (Gallinago) 110, 114, 316, 337
Gallinago grallinaria 110
hyemalis 316, 337
japonica 110
media 110
punctata 122
scolopacinus 110
gallinago (Scolopax) 110
Gallinago stenura 110
uniclavus 110

Page.

Gallinago wilsonii 118
gambeli (Anser) 143, 146
(Anser albifrons) 145, 317, 337, 341
garrula (Bombycilla) 288
garrulus (Ampelis) 288, 289
Garrulus glandarius 284
infaustus 285
Gavia alba 315, 332, 339
Gavina kamtschatschensis 73, 75
gelastes (Columba turtur) 324
giu (Scops) 289
glacialis (Anas) 159
(Colymbus) 14, 16
(Fratercula) 89
(Fulmarus) 91, 94
glupischa (Fulmarus) 91, 316, 337, 340
(Harelda) 169
minor (Fulmarus) 94
(Mormon) 89
(Procellaria) 91
rodgersii (Fulmarus) 94
(Sterna) 84
(Tringa) 140
glandarius (Corvus) 282
(Garrulus) 284
glareola (Totanus) 130, 317, 337
(Tringa) 130
(Trynga) 132, 137
glaucescens (Larus) 56, 62, 63, 66, 314, 315, 337, 339
Glaucion (Anas) 163, 173
Glaucion clangula 163
glaucion (Clangula) 163
glaucoides (Larus) 64
glaucopterus (Larus) 63, 64
Glaucus glaucopterus 63, 64
glaucus (Larus) 63, 64, 67, 314, 336, 339
glottis (Scolopax) 128
(Totanus) 125, 128
glottoides (Totanus) 128
(Totanus nebularius) 128
glupischa (Fulmarus) 19
(Fulmarus glacialis) 91, 316, 337, 340
Graculus bairdii 187
bicristatus 181, 187
urile 189
violaceus 177
grallinaria (Gallinago) 110
grandis (Anser) 141, 142, 144
grebnitskii (Carpodacus erythrinus) 265, 322, 333, 346, 349
(Corvus) 287
grisea (Motacilla melanope) 294
grisegena (Colymbus) 11, 13
griseigena (Podiceps) 11
griseinucha (Leucosticte) 261
(Leucosticte tephrocotis) 261
(Montifringilla) 261
griseiventris (Bonasa) 319
griseogenys (Leucosticte) 261
grisconucha (Fringilla) 261
(Leucosticte) 261, 322, 336
griseopygius (Totanus) 127
groenlandicus (Falco) 202, 203
(Falco gyrfalco) 203
Grus grus orientalis 327, 328
grus orientalis (Grus) 327, 328

Page.

lle (Cepphus) 21
(Uria) 21
lle β (Uria) 21
ara alba 129
tavi (Anthus) 274, 276, 278, 323, 337, 346, 349
(Corydalla) 274
tifera (Terekia) 125
tifer (Pseudototanus) ... 124, 125, 126, 316, 338, 346
(Totanus) 124, 127
(Xenus) 124
turalis (Chelidon) 270, 271, 347
(Hirundo) 269, 330
falco (Accipiter) 204
falco-candicans (Falco) 203
candicans (Falco) 205
(Hierofalco) 205
(Falco) 203, 204, 206
groenlandicus (Falco) 203
islandicus (Falco) 203
sacer (Hierofalco) 203

H.

matopus bachmani 102
hypoleuca 100
longirostris 100, 101
osculans 100, 101, 316, 338
ostralegus 100, 101
osculans 100
palliatus 101
lisetus albicilla 214, 216, 217, 320, 337
borealis 209
hypoleucus 213, 320, 338, 342, 343
leucocephalus 209, 210, 213, 214, 215, 216, 219, 320, 336
ustus (Accipeter) 219
liaëtus albicilla hypoleucus 213, 214
ustus carolinensis (Pandion) 220
(Falco) 219, 320
orientalis (Pandion) 219
(Pandion) 219, 320, 337
ustus pelagicus 217
elda glacialis 169
histrionica 166
hyemalis 167, 169, 318, 336
ghtoni (Pseudotanus) 125
(Totanus) 125
retica (Squatarola) 103
(Tringa) 103
nichelidon sibirica 272
dersonii (Locustella) 300, 325, 338
(Lusciniopsis) 300
ractitis brevipes 132, 133, 134, 135, 136, 137
incanus 132, 133, 134, 135, 317, 336
roscelus brevipes 132
incanus 132, 137
icula (Ægialitis) 109, 349, 350
nalis (Colymbus) 14
(Troglodytes) 297
rofalco candicans 205
gyrfalco candicans 205
sacer 203
holbœlli 205
islandus holbœlli 203
alayanus (Cuculus) 225, 228
undo americana 269
baïcalensis 330

Page.

Hirundo borealis 323, 330
domestica 269
erythrogastra 269
gutturalis 269, 330
kamtschatica 323, 330
lagopoda 323
riparia 267, 323
rufa 269
rustica 269
baïcalensis 330
borealis 330
kamtschatica 330
rufa 269, 323, 347
saturata 330
tytleri 269
saturata 269, 270, 330
tytleri 269
histrionica (Anas) 166
(Clangula) 166
(Fuligula) 166
(Harelda) 166
Histrionicus histrionicus 166, 318, 336
histrionicus (Histrionicus) 166, 318, 336
Histrionicus minutus 166, 167
torquatus 166
histrionis (Anas) 166
holbœlli (Falco) 203
(Hierofalco) 205
(Hierofalco islandus) 203
holbœllii (Acanthis) 256
(Acanthis linaria) 256, 322, 336
(Colymbus) 11, 313, 337, 341
(Linaria) 256
(Podiceps) 11
homeyeri (Phyllopseustes) 325, 338, 346
hornemannii (Acanthis) 258
exilipes (Acanthis) 258, 322, 337, 341
hortorum (Dryobates minor) 233
hutchinsii (Anser) 147
(Bernicla) 147, 148
(Branta canadensis) 147, 318, 337, 341
hyemalis (Anas) 163, 169
(Gallinago) 316, 337
(Harelda) 167, 169, 318, 336
Hylocichla aliciæ 325
hyperborea (Lagopus) 200
(Tringa) 139
hyperboreus (Anser) 317
(Chen) 317, 336
(Lobipes) 139
(Phalaropus) 139
Hypocenter aureolus 244, 322, 337
rusticus 246, 322, 337
variabilis 247, 322, 338
hypoleuca (Hæmatopus) 100
hypoleucos (Actitis) 131, 137, 317, 337
(Tringa) 131
(Tringoides) 131
hypoleucus (Haliæetus) 213, 320, 338, 342, 342
(Haliaetus albicilla) 213, 214
hypomelanus (Charadrius) 104
Hypotriorchis subbuteo 319

I.

Ianthia cyanura 306, 325, 338
rufilata 309

Page.

iliacus (Turdus) 349
imber (Urinator) 15, 313
immaculatus (Dendrocopos) 231
(Dryobates) 231, 321, 338, 342
(Dryobates minor) 233
(Dryobates pipra) 233
immer (Colymbus) 16
imperator (Falco) 217
incana (Scolopax) 132
incanus (Actitis) 132
(Heteractitis) 132, 133, 134, 135, 317, 336
(Heteroscelus) 132, 137
(Totanus) 137
indicus (Cuculus) 227, 228
(Cuculus canorus) 228
infaustus (Garrulus) 354
infuscata (Muscicapa) 272
innominatus (Acanthis) 252
insularis (Lagopus rupestris) 194
intermedia (Alauda) 234, 235, 236
intermedius (Acanthis) 256
interpres (Arenaria) 102, 316, 336, 349
(Strepsilas) 102
(Tringa) 102
islandica (Clangula) 164
islandicus candicans (Falco) 205
(Falco candicans) 208
(Falco) 208
(Falco gyrfalco) 208
islandorum (Lagopus) 200
islandus albus (Falco) 204
(Falco) 208, 204, 319, 336
fuscus (Falco) 208
holbœlli (Hierofalco) 208
maculatus (Falco) 204
ispida bengalensis (Alcedo) 354

J.

japonensis (Corvus) 239, 240, 354
japonica (Alauda) 234, 235, 236
(Gallinago) 110
(Motacilla) 287, 288, 289, 324, 351
japonicus (Anthus) 275, 323, 338, 349
(Corvus) 239
(Dryobates) 230
javanica (Terekia) 132
javanicus (Totanus) 132
javensis (Pallenura) 283

K.

kamtschatschensis (Gavina) 73, 75
(Larus) 73, 315, 337, 340
kamtschatica (Alca) 25
(Chelidon) 323, 330, 338, 346
(Hirundo) 323, 330
(Hirundo rustica) 330
(Motacilla) 287
(Pica) 241, 243
(Pyrrhula pyrrhula) 322, 338, 342
kamtschaticus (Corvus corax) 321, 344
(Tetrao) 192
(Urogallus parvirostris) 192, 193, 319, 338, 342
kamtschatkensis (Corythus enucleator) 322
(Lusciola) 310
kamtschatkensis (Parus) ..... 232, 297, 324, 336, 3[illegible]
(Picus) ..... 2[illegible]
(Poecila) ..... 2[illegible]
(Scops) ..... [illegible]
(Sylvia) ..... [illegible]
kawarahiba (Chloris) ..... 265, 3[illegible]
(Chlorospiza) ..... [illegible]
(Fringilla) ..... [illegible]
kawariba (Carduelis) ..... [illegible]
(Chlorospiza) ..... [illegible]
(Fringilla) ..... [illegible]
(Ligurinus) ..... [illegible]
kelungensis (Cuculus) ..... 226, 2[illegible], 228
(Cuculus saturatus) 228
kennicotti (Phyllopneuste) ..... 3[illegible], 304
(Phyllopseustes borealis) 303
kittlitzii (Brachyramphus) ..... 314, 331, 3[illegible], 340
kotsbuei (Rissa tridactyla) 78
kotzebui (Larus tridactylus) 78
(Rissa) 78, 80, 82
kumlieni (Larus) 64

L.

labradorica (Sagmatorrhina) 44
lagopoda (Hirundo) 323
lagopus (Accipiter) 203
Lagopus albus 194, 195
alpinus 194, 319
lagopus (Archibuteo) 208, 320, 329, 336
(Aquila) 208
(Falco) 208
ferrugineus (Archibuteo) 329
Lagopus hyperboreus 200
islandorum 200
lagopus 194, 319
lagopus (Lagopus) 194, 319
Lagopus muta 195, 199, 200
mutus 319, 337, 343
ridgwayi 194, 199, 200, 319, 330, 336
rupestris 195, 199
atkhensis 195
insularis 194
nelsoni 195
lagopus sancti-johannis (Archibuteo) 208
Lagopus subalpinus 194
lagopus (Tetrao) 194
lanceolata (Locustella) 300
Lanius cristatus ..... 3[illegible], 338
major 338
phoenicurus ..... 3[illegible], 354
sibiricus ..... 3[illegible], 337
lapponica baueri (Limosa) ..... 122, 31[illegible], 338
(Fringilla) 250
(Limosa) 122
novæ-zelandiæ (Limosa) 122
lapponicus (Calcarius) ..... 250, 277, 322, 336, 34[illegible], 349
(Centrophanes) 250
(Plectrophanes) 250
(Tetrao) 194
Laroides chalcopterus 64
Larus affinis ..... [illegible], 72[illegible], 314
argentatus ..... [illegible], 72
cachinnans ..... [illegible], 68
atricilla 77
borealis ..... [illegible], 66, 67, 315

Page.

ns..... .....78, 79, 80, 82
.....78, 79, 80, 82
ns..... 77
.....67, 72, 315, 337, 340
.....73, 74, 75
.....74, 76, 315, 337, 340
..... 75
..... 77
..... 64
..... 64
..... 86
.....73, 74, 75
..... 314
..... 67
..... 62
..56, 62, 63, 66, 314, 315, 337, 340
..... 64
..... 62, 64
... .63, 64, 67, 314, 336, 340
sis.....73, 315, 337, 340
..... 64
....62, 63, 64
.....67, 71, 72, 73
..... 64
.....73, 74, 78, 79
.....67, 69, 314
..... 86
.....67, 68, 314
.....76, 77, 315, 337
jor..... 77
..... 78
..... 78
.....67, 73, 314, 337, 340
..... 78
zebui 78
..... 82
ma)..... 44
..... 97
a)..... 97
..... 87
..... 87
..... 86
..... 86, 87
..... 331
a)..... 209
)..... 209
etus) 209, 210, 213, 214, 215, 216, 219, 320, 336
..... 241, 242
..... 354
). 147
..... 147
..... 147
.. .. 323
) 287, 290
..... 241
..... 316
..... 131
..... 217
.....62, 63, 64
rea) 97
oma).....97, 316, 336, 340
ia)..... 97
ucha 261, 262
aucha.....262, 322, 338, 344
ha..... 261

Page.

Leucosticte griseogenys 261
griseonucha.....261, 322, 336
tephrocotis 261
griseinucha..... 261
leucostria (Budytes)..... 280
leucostriatus (Budytes)..... 280
(Budytes flavus).....280, 282, 303, 324, 338
leucotus (Dryobates)..... 321
leucura (Erythrosterna)..... 274
(Muscicapa)..... 274
levaillantii (Corvus)....?..... 239
(Corvus corone).....239, 322, 338
Ligurinus kawariba..... 265
Limosa ægocephala melanuroides.... ..... 316, 338
australasiana 122
barge 122
baueri..... 122
cinerea..... 132
foxii..... 122
lapponica..... 122
baueri.....122, 316, 338
novæ-zelandiæ..... 122
melanura..... 316
melanuroides 316
novæ-zelandiæ 122
recurvirostra..... 132
rufa..... 122
limosa (Scolopax) 131
Limosa uropygialis 122
linaria (Acanthis) 56, 252, 322, 336
(Ægiothus)..... 252
Linaria betularum 253, 255
linaria canescens (Fringilla)..... 258
exilipes (Ægiothus)..... 258
(Fringilla)..... 252
Linaria holbœllii..... 256
linaria holbœllii (Acanthis).....256, 322, 336
(Linota)..... 258
Linaria magnirostris..... 256
ordinaria 253
linaria pallescens (Acanthis)..... 259
Linaria parvirostris..... 253
linaria (Passer)..... 252
Linaria vera..... 256
Linota linaria..... 258
rufescens..... 252
littorea (Trynga)..... 130
lobata (Tringa)..... 139
lobatus (Phalaropus).....139, 317, 336
Lobipes hyperboreus..... 139
wilsonii..... 140
Locustella hendersonii.....300, 325, 338
lanceolata 300
minuta 300
nævia..... 301
subcerthiola..... 299
locustella (Sylvia)..... 300
Lomvia arra..... 17
lomvia arra (Uria) 17, 62, 314, 337, 340
Lomvia arra svarbag..... 18
californica..... 17
lomvia (Cepphus)..... 17
Lomvia svarbag arra..... 18
troile..... 20
californica..... 20

Page.

longicaudus (Stercorarius)....87, 88, 316, 336
longipennis (Sterna)....83, 84, 85
longipes (Charadrius)....104
(Pluvialis)....104
longirostris (Colymbus)....12
(Hæmatopus)....100, 101
Loxia bifasciata....323
crucirostra....323
enucleator....322
erythrina....265
leucoptera....323
ludovicianus (Anthus)....277, 323
lugens (Motacilla)....286, 287, 288, 289, 324, 338, 351, 352, 353
(Motacilla alba)....284, 287
lugubris (Motacilla)....287
lumme (Colymbus)....15
(Urinator)....15, 314, 336
Lunda arctica....59
cirrhata....19, 21, 26, 28, 31, 43, 45, 46, 47, 48, 57, 61, 62, 95, 314, 337, 340
psittacula....38
Lusciniopsis hendersonii....300
Lusciola calliope....309
cyanura....308
erythronota....354
kamtschatkensis....310
luteola (Muscicapa)....274, 354
luzoniensis (Numenius)....138
(Scolopax)....138

M.

macrura (Sterna)....85
maculatus (Anthus)....278
(Falco islandus)....204
(Pipastes)....278, 323, 338
magnirostris (Linaria)....256
(Phyllopneuste)....302
major (Dryobates)....230

Pa

Mecistura caudata....
media (Gallinago)....
(Pica)....
Megascops scops....
Melodes calliope....309, 32
Melanetta fusca....
velvetina....
melania (Cymochorea)....
melanocephala (Arenaria)....
melanope (Calobates)....
(Motacilla)....283, 292, 324
grisea (Motacilla)....
(Motacilla sulphurea)....
melanops (Calobates)....
melanorhynchus (Numenius)....
melanotos (Pica pica)....
melanura (Limosa)....
melanuroides (Limosa)....
(Limosa ægocephala)....316
melanotis (Milvus niger)....
Merganser americanus....
merganser americanus (Mergus)....
Merganser merganser....176, 177, 318, 331
merganser (Merganser)....176, 177, 318, 331
(Mergus)....
Merganser serrator....177, 178, 318
Mergellus albellus....
Mergulus cirrhocephalus....
Mergus albellus....178, 318
castor....
merganser....
americanus....
serrator....
serratus....
microceros (Ciceronia)....
(Phaleris)....
micropterus (Cuculus)....
Micropus pacificus....321
microrhynchos (Colymbus)....
middendorffi (Anser)....

Page.

fringilla pustulata 261
speciosa 261
ella collaris 102
ellus (Eudromias) 109, 349
on cirrhatum 43
corniculata 59
cristatellus 25
glacialis 59
septentrionale 59
superciliosa 25
illa alba 292, 324
lugens 284, 287
albeola 287
camtschatcse 287
camtschatica 287
amurensis 287, 289
baicalensis temporalis 285
blakistoni 287, 289, 290
boarula 284
calliope 309
cervina 323
citrinella 324
cyanura 308
flava 280
flaveola 280
japonica 287, 288, 289, 324, 351
kamtschatica 287
leucoptera 287, 290
lugens 286, 287, 288, 289, 324, 338, 351, 352, 358
lugubris 287
melanope 283, 292, 324, 337
grisea 284
oculatis 284, 285, 286, 287, 288, 289, 324, 338, 349, 351, 352, 353
phoenicurus 325
sulphurea 283
melanope 283
trochilus 302
tschuktschensis 283
i (Colymbus) 16
aki (Erythrosterna) 274
apa albicilla 273
cinereo alba 272, 354
fuscedula 272
infuscata 272
leucura 274
luteola 274, 354
parva 274
pondiceriana 272
sibirica 272
a (Zonotrichia) 247
us (Cygnus) 149
(Lagopus) 195, 199, 200
(Lagopus) 319, 337, 343
ea (Phaleris) 25, 33
(Uria) 25

N.

(Locustella) 301
anni (Turdus) 349, 350, 354
ica (Aythya marila) 161
larius glottoides (Totanus) 128
(Scolopax) 128
(Totanus) 125, 126, 128, 317, 337

Page.

neglectus (Troglodytes) 298
nelsoni (Lagopus rupestris) 195
(Larus) 64
Nemura cyanura 308
rufilata 309
Nettion crecca 155, 318, 337
falcata 156
niger melanotis (Milvus) 354
nigra (Anas) 174
(Procellaria) 96
nigricans (Anser) 149
(Bernicla) 149
(Bernicla brenta) 149
(Branta) 149, 318, 337, 341
nigricollis (Colymbus) 12
nigripes (Diomedea) 90, 91, 316, 331
nisoria (Strix) 320
nisus (Accipiter) 320, 337
nivalis (Emberiza) 248
(Plectrophanes) 248
(Plectrophenax) 248, 277, 322, 336
nivea (Nyctea) 221
(Rissa) 78, 82
(Strix) 221
niveiventris (Thamnobia) 274
niveus (Larus) 73, 74
(Larus) 78, 79
nobilis (Aquila) 320, 329
nodirostra (Phaleris) 35
novæ-guineæ (Budytes) 284
novæ-zelandiæ (Limosa) 122
(Limosa lapponica) 122
Nucifraga caryocatactes 321, 337
Numenius arquata 317
atricapillus 138
australis 317
cyanopus 317, 338
luzoniensis 138
melanorhynchus 138
phæopus 138
phæopus variegatus 138, 317, 338
pygmeus 349
tahitiensis 138, 317
uropygialis 138
variegatus 138
Nyctala tengmalmi 223
Nyctea nivea 221
nyctea 221, 320, 336
nyctea (Nyctea) 221, 320, 336
Nyctea scandiaca 221
nyctea (Strix) 221
(Surnia) 221

O.

oahuensis (Tringa) 102
obscurus (Turdus) 307, 325, 330, 338
occidentalis (Branta) 147, 148
(Cerorhinca) 35
(Larus) 67, 69, 314
oceanicus (Totanus) 132
Oceanodroma furcata 31, 97, 98, 316, 337, 340
leucorhoa 97, 316, 336, 340
melania 97
ochotensis (Acrocephalus) 299, 301, 324, 338

Page.

ochrotensis (Calamodyta)..... 299
(Sylvia)..... 299
ocularis (Motacilla)...284, 285, 286, 287, 288, 299, 321, 338, 349, 351, 352, 353
Œdemia americana..... 174
œnanthe (Saxicola)..... 226, 349
Œstrelata desolata..... 316
Oidemia americana.....174, 318, 341
deglandi.....174, 175, 318, 341
fusca..... 175, 176
velvetina..... 174, 175
Olor americanus..... 150
olor (Anas)..... 149
Olor bewickii..... 150, 151
columbianus.....150, 151, 318, 336
cygnus.....149, 150, 152, 318, 337
olor (Cygnus)..... 149
Ombria psittacula..... 38
ordinaria (Linaria)..... 253
Oreopneuste fuscata..... 354
orientalis (Charadrius auratus)..... 104
(Corvus)..... 239, 240
(Grus grus)..... 317, 338
(Pandion haliætus)..... 219
(Procellaria)..... 98
osculans (Hæmatopus).....100, 101, 316, 338
(Hæmatopus ostralegus)..... 100
ossifraga (Aquila)..... 217
ostralegus (Hæmatopus)..... 100, 101
osculans (Hæmatopus)..... 100
Otomela phœnicura..... 323
superciliosa..... 323
otus (Asio)..... 320
Otus brachyotus..... 220, 329
vulgaris..... 320, 329

P.

pacifica (Pelidna)..... 120, 121
(Pelidna alpina).....120, 121, 316, 337, 341
(Procellaria)..... 91
(Scolopax)..... 132
pacificus (Cypselus)..... 321

Page.

parasita (Lestris)..... 86
parasitica (Lestris)..... 86, 87
parasiticus (Larus)..... 86
(Stercorarius).....86, 87, 88, 94, 314, 338
pardela (Charadrius)..... 101
parotis (Colymbus)..... 13
Parus ater 234, 237, 349
baicalensis..... 232, 236
carbonarius..... 237
kamtschatkensis.....232, 237, 324, 338, 342, 343
palustris..... 237
camtschatkensis..... 236
wiemuthi..... 237
parva (Muscicapa)..... 274
parvirostris kamtschaticus (Urogallus)...192, 193, 319, 338, 342
(Linaria)..... 253
sachalinensis (Urogallus)..... 193
(Tetrao)..... 192
(Urogallus)..... 192, 193
Passer arctous 261, 345
calcaratus 250
passerina (Strix)..... 354
Passer linaria..... 252, 254, 345
montanus..... 254
montifringilla..... 26[illegible]
Pavoncella pugnax.....317, 337, [illegible]
pealei (Falco).....206, 319, 329, [illegible]
(Falco communis)..... [illegible]
(Falco peregrinus)..... [illegible]
pectoralis (Tringa)..... [illegible]
pedestris (Totanus)..... 132, [illegible]
pelagica (Aquila).....209, 217, [illegible]
(Procellaria)..... [illegible]
pelagicus (Carbo)..... [illegible]
(Haliætus)..... [illegible]
(Larus).....67, 68, [illegible]
(Phalacrocorax).....19, 56, 149, 185, [illegible]
318, 337, [illegible]
resplendens (Phalacrocorax)... [illegible]
(Thalassoæctus).....212, 213, 217, 330, [illegible]
Pelecanus urile..... [illegible]

	Page.
lacrocorax urile	181, 318, 337, 340
violaceus	181, 184, 187
laropus cinerascens	139
cinereus	139
fulicarius	140
hyperboreus	139
lobatus	139, 317, 336
rufescens	140
ruficollis	139
rufus	140
leris aleuticus	38
camtschatica	25
corniculata	35
cristatella	25, 32
cristella	25
microceros	35
mystacea	25, 33
nodirostra	35
psittacula	38
pusilla	35
pygmæa	25, 35, 38
superciliata	33
tetracula	33, 38
enicura (Otomela)	323
enicurus aurorens	325
enicurus (Lanius)	323, 354
(Motacilla)	325
ygilus unicolor	248
ilopneuste borealis	302
kennicotti	302, 304
magnirostris	302
albirica	354
superciliosa	354
sylvicultrix	302, 304
xanthodryas	304
ilopseustes borealis	302, 304, 305, 325, 337, 349
borealis kennicotti	303
borealis xanthodryas	306
homeyeri	325, 338, 346
xanthodryas	304, 305, 325, 338
lloscopus borealis	302
sylvicultrix	302
xanthodryas	304
borealis (Pica)	242
camtschatica	241, 322, 338, 342
camtschatica (Pica)	242
(Corvus)	241
caudata	241
kamtschatica	241, 243
leuconotos	241, 242
leucoptera	241
media	241
melanotos (Pica)	242
Pica)	243
ica	243
borealis	242
camtschatica	242
melanotos	242
ericea	241, 243
es albidior	321, 338, 342
crissoleucus	321
cirris	321
kamtschatkensis	230, 231
leuconotus	354
major	230, 233

	Page.
Picus major kamtschaticus	230
martius	354
minor	231, 233
tridactylus	321
pilaris (Turdus)	325
Pinicola enucleator	322, 336
flammula	322
Pipastes agilis	275, 276
maculatus	278, 323, 338
trivialis	280
pipra (Dryobates)	232
immaculatus (Dryobates)	233
pithyornus (Emberiza)	354
placida (Ægialitis)	350
Platypus fuligula	160
marila	160
Plectrophanes calcaratus	250
lapponicus	250
nivalis	248
Plectrophenax nivalis	248, 277, 322, 336
pluvialis (Charadrius)	104
Pluvialis longipes	104
Podiceps affinis	11
auritus	12, 14
canogularis	13
cooperi	11
cornutus	14
cucullatus	11
griseigena	11
holbœllii	11
rubricollis	11
major	11
subcristatus	11
major	11
Pœcila kamtschatkensis	297, 298
Pœcilia borealis	298
pollicaris (Rissa tridactyla)	78, 80, 315, 337, 340
polyagrus (Falco)	206
polynesiæ (Totanus)	132, 136
Polysticta stelleri	170
pomarina (Lestris)	331
pomarinus (Stercorarius)	331, 336, 340
pondiceriana (Muscicapa)	272
pratensis (Anthus)	226
Priocella tenuirostris	91, 96
Procellaria æquinoctialis	96
curilica	96
furcata	98
glacialis	91
leachii	97
leucorhoa	97
nigra	96
orientalis	98
pacifica	91, 97
tenuirostris	96
Pseudototanus guttifer	124, 125, 126, 316, 338, 346
haughtoni	125
psittacula (Alca)	38
(Lunda)	38
(Ombria)	38
(Phaleris)	38
psittaculus (Cyclorrhynchus)	38, 39, 314, 337, 340
(Simorhynchus)	38
Pterocyanea querquedula	156
ptilocnemis (Arquatella)	112, 113

Page.

ochrotensis (Calamodyta)..... 299
(Sylvia)..... 299
ocularis (Motacilla)...284, 285, 286, 287, 288, 299, 321, 338, 349, 351, 352, 353
Œdemia americana..... 174
œnanthe (Saxicola)..... 226, 349
Œstrelata desolata..... 316
Oidemia americana.....174, 318, 341
deglandi.....174, 175, 318, 341
fusca..... 175, 176
velvetina..... 174, 175
Olor americanus..... 150
olor (Anas)..... 149
Olor bewickii..... 150, 151
columbianus.....150, 151, 318, 336
cygnus.....149, 150, 152, 318, 337
olor (Cygnus)..... 149
Ombria psittacula..... 88
ordinaria (Linaria)..... 253
Oreopneuste fuscata..... 354
orientalis (Charadrius auratus)..... 104
(Corvus)..... 239, 240
(Grus grus)..... 317, 338
(Pandion haliætus)..... 219
(Procellaria)..... 98
osculans (Hæmatopus).....100, 101, 316, 338
(Hæmatopus ostralegus)..... 100
ossifraga (Aquila)..... 217
ostralegus (Hæmatopus)..... 100, 101
osculans (Hæmatopus)..... 100
Otomela phœnicura..... 323
superciliosa..... 323
otus (Asio)..... 320
Otus brachyotus..... 220, 329
vulgaris..... 320, 329

P.

pacifica (Pelidna)..... 120, 121
(Pelidna alpina).....120, 121, 316, 337, 341
(Procellaria)..... 91
(Scolopax)..... 132
pacificus (Cypselus)..... 321
(Fulmarus)..... 91
(Micropus)..... 321, 338
(Troglodytes)..... 293, 294
pallasii (Cinclus)..... 324, 354
pallens (Turdus)..... 307
Pallenura javensis..... 283
robusta..... 284
sulphurea..... 283
pallescens (Acanthis linaria)..... 259
(Anorthura)..... 292
(Troglodytes)..... 56, 292, 324, 336
palliatus (Hæmatopus)..... 101
palumaribus (Astur)..... 319
palumbarius (Astur)..... 320, 329
palustris (Brachyotus)..... 221
camtschatkenis (Parus)..... 298
(Parus)..... 297
(Strix)..... 221
Pandion haliætus.....219, 320, 337
carolinensis..... 220
orientalis..... 219
paradisæa (Sterna)..... 85, 315, 336, 346
parasita (Carractes)..... 86

Page.

parasita (Lestris)..... 86
parasitica (Lestris)..... 86, 87
parasiticus (Larus)..... 86
(Stercorarius).....86, 87, 88, 94, 316, 336
pardela (Charadrius)..... 104
parotis (Colymbus)..... 13
Parus ater.....334, 337, 342
baicalensis..... 222, 298
carbonarius..... 297
kamtschatkensis....232, 297, 334, 338, 342, 343
palustris..... 297
camtschatkensis..... 298
wiemuthi..... 297
parva (Muscicapa)..... 274
parvirostris kamtschaticus (Urogallus)...192, 198, 319, 338, 342
(Linaria)..... 253
sachalinensis (Urogallus)..... 198
(Tetrao)..... 198
(Urogallus)..... 192, 198
Passer arctous..... 261, 345
calcaratus..... 260
passerina (Strix)..... 354
Passer linaria..... 262, 264
montanus..... 264
montifringilla..... 264
Pavoncella pugnax.....317, 337, 346
pealei (Falco).....208, 319, 339, 336
(Falco communis)..... 206
(Falco peregrinus)..... 206
pectoralis (Tringa)..... 115
pedestris (Totanus)..... 132, 137
pelagica (Aquila).....209, 217, 320
(Procellaria)..... 97
pelagicus (Carbo)..... 121
(Haliætus)..... 217
(Larus)..... 67, 68, 314
(Phalacrocorax).....19, 56, 149, 185, 187, 318, 337, 340
resplendens (Phalacrocorax)..... 188
(Thalassoëtus).....212, 213, 217, 320, 338
Pelecanus urile..... 181
violaceus..... 181
Pelidna alpina..... 120
americana..... 120
pacifica.....120, 121, 316, 337, 341
americana..... 121
ferruginea..... 349
pacifica..... 120, 121
penelope (Anas)..... 157
(Mareca).....157, 318, 337
peninsulæ (Cuculus).....227, 228, 321, 338, 346
peregrinus (Falco)..... 319, 339, 337
pealei (Falco)..... 206
personata (Emberiza)..... 354
perspicillatus (Phalacrocorax) 180, 187, 190, 318, 338
phœopus (Numenius)..... 133
variegatus (Numenius).....133, 317, 338
Phalacrocorax scolus..... 187
bicristatus..... 181, 187
carbo..... 318
pelagicus.....19, 56, 149, 185, 187, 318, 337, 340
resplendens..... 188
perspicillatus..180, 187, 190, 318, 338

	Page.
Lacrocorax urile	181, 318, 337, 340
violaceus	181, 184, 187
Laropus cinerasceus	139
cinereus	139
fulicarius	140
hyperboreus	139
lobatus	139, 317, 336
rufescens	140
ruficollis	139
rufus	140
eris aleuticus	38
camtschatica	25
corniculata	35
cristatella	25, 32
cristella	25
microceros	35
mystacea	25, 33
nodirostra	35
psittacula	38
pusilla	35
pygmæa	25, 35, 38
superciliata	33
tetracula	33, 38
nicura (Otomela)	323
nicurus auroreus	325
nicurus (Lanius)	323, 354
(Motacilla)	325
gilus unicolor	248
lopneuste borealis	302
kennicotti	302, 304
magnirostris	302
sibirica	354
superciliosa	354
sylvicultrix	302, 304
xanthodryas	304
lopseustes borealis	302, 304, 305, 325, 337, 349
borealis kennicotti	303
borealis xanthodryas	306
homeyeri	325, 338, 346
xanthodryas	304, 305, 325, 338
loscopus borealis	302
sylvicultrix	302
xanthodryas	304
orealis (Pica)	242
amtschatica	241, 322, 338, 342
amtschatica (Pica)	242
Corvus)	241
audata	241
kamtschatica	241, 243
leuconotos	241, 242
leucoptera	241
media	241
melanotos (Pica)	242
Pica)	243
pica	243
borealis	242
camtschatica	242
melanotos	242
nerica	241, 243
des albidior	321, 338, 342
crisoleucus	321
s cirris	321
kamtschatkensis	230, 231
leuconotus	354
major	230, 233

	Page.
Picus major kamtschaticus	230
martius	354
minor	231, 233
tridactylus	321
pilaris (Turdus)	325
Pinicola enucleator	322, 336
flammula	322
Pipastes agilis	275, 276
maculatus	278, 323, 338
trivialis	280
pipra (Dryobates)	232
immaculatus (Dryobates)	233
pithyornus (Emberiza)	354
placida (Ægialitis)	350
Platypus fuligula	160
marila	160
Plectrophanes calcaratus	250
lapponicus	250
nivalis	248
Plectrophenax nivalis	248, 277, 322, 336
pluvialis (Charadrius)	104
Pluvialis longipes	104
Podiceps affinis	11
auritus	12, 14
canogularis	13
cooperi	11
cornutus	14
cucullatus	11
griseigena	11
holbœllii	11
rubricollis	11
major	11
subcristatus	11
major	11
Pœcila kamtschatkensis	297, 298
Pœcilia borealis	298
pollicaris (Rissa tridactyla)	78, 80, 315, 337, 340
polyagrus (Falco)	206
polynesiæ (Totanus)	132, 136
Polysticta stelleri	170
pomarina (Lestris)	331
pomarinus (Stercorarius)	331, 336, 340
pondiceriana (Muscicapa)	272
pratensis (Anthus)	226
Priocella tenuirostris	91, 96
Procellaria æquinoctialis	96
curilica	96
furcata	98
glacialis	91
leachii	97
leucorhoa	97
nigra	96
orientalis	98
pacifica	91, 97
tenuirostris	96
Pseudototanus guttifer	124, 125, 126, 316, 338, 346
haughtoni	125
psittacula (Alca)	38
(Lunda)	38
(Ombria)	38
(Phaleris)	38
psittaculus (Cyclorrhynchus)	38, 39, 314, 337, 340
(Simorhynchus)	38
Pterocyanea querquedula	156
ptilocnemis (Arquatella)	112, 113

Page.

Ptychoramphus aleuticus..... 27, 314
Puffinus curilicus..... 96
tenuirostris.....96, 316, 337, 340
pugnax (Pavoncella).....317; 337, 346
(Tringa)..... 131
(Trynga)..... 317
pulverulentus (Actitis)..... 137
(Totanus)..... 137
punctata (Gallinago)..... 122
purus (Dendrocopos)..... 230
(Dryobates).....230, 321, 338, 342
pusilla (Ciceronia)..... 35, 39
(Emberiza)..... 354
(Phaleris)..... 35
(Tringa)..... 119
(Uria)..... 35
pusillus (Simorhynchus).....24, 34, 35, 43, 314, 337, 340
pustulata (Montifringilla)..... 261
pygmæa (Phaleris)..... .....25, 35, 38
pygmæus (Eurynorhynchus)..... 349, 350
(Numenius)..... 349
(Simorhynchus) ...24, 25, 33, 34, 35, 42, 43, 45, 314, 337, 340
Pyrrhula erythrina..... 265
pyrrhula kamtschatica (Pyrrhula).....322, 338, 342
Pyrrhula pyrrhula kamtschatica.....322, 338, 342
rubicilla..... 322

Q.

querquedula (Anas)..... 156
Querquedula circia..... 156
crecca..... 155
falcaria..... 157
falcata..... 156
querquedula (Pterocyanea)..... 156
Querquedula querquedula.....156, 318, 337
querquedula (Querquedula) 156, 318, 337

R.

recurvirostra (Limosa)..... 132
Regulus cristatus..... 354
resplendens (Phalacrocorax pelagicus)... 188
Rhodostethia rosea..... 315
Rhynchaspis clypeata..... 159
ridgwayi (Lagopus).....194, 199, 200, 319, 330, 336
ridibundus (Chroicocephalus)..... 76
(Larus).....76, 77, 315, 337
major (Larus)..... 77
riparia cinerea* (Clivicola)..... 268
(Clivicola).....267, 323, 337
(Cotyle)..... 267
(Hirundo) 267, 323
risoria (Columba)..... 354
Rissa brevirostris.....82, 83, 315, 337, 340
kotzebui 78, 80, 82
rissa (Larus)..... 78
Rissa nivea..... 78, 82
tridactyla..... 78
tridactyla kotzbuei..... 78

Page.

Rissa tridactyla pollicaris.....78, 80, 315, 337, 340
robusta (Pallenura)..... 204
rodgersii (Fulmarus glacialis) 94
rosea (Rhodostethia)..... 315
roseus (Carpodacus)..... 354
rostrata (Acanthis) 330
rubicilla (Pyrrhula) 322
rubricollis (Colymbus)..... 12
(Podiceps)..... 11
major (Podiceps)..... 11
rufa (Hirundo) 269
(Hirundo rustica).....269, 323, 347
(Limosa)..... 123
rufescens (Linota)..... 333
(Phalaropus)..... 140
(Tringa) 115
ruficapilla (Ægialitis)..... 106
ruficollis (Actodromas).....117, 118, 316, 338
(Phalaropus) 139
(Tringa)..... 116, 118
(Turdus)..... 338
rufilata (Ianthia) 339
(Nemura) 339
rufogularis (Colymbus) 16
rufus (Phalaropus) 140
rupestris atkhensis (Lagopus)..... 195
insularis (Lagopus)..... 194
(Lagopus)..... 195, 199
nelsoni (Lagopus)..... 195
(Tetrao urogallus)..... 192
balcalensis (Hirundo)..... 338
borealis (Hirundo) 339
(Chelidon)..... 269, 273
(Emberiza) 246
(Hirundo) 269
kamtschatica (Hirundo)..... 339
rufa (Hirundo).....269, 323, 347
saturata (Hirundo) 339
tytleri (Hirundo)..... 269
rusticolus (Falco).....203, 204, 319, 336
rusticus (Hypocentor).....246, 322, 337
rutila (Emberiza)..... 354
rysea (Larus)..... 78

S.

sabinii (Xema)..... 315
sacer (Hierofalco gyrfalco)..... 203
sachalinensis (Tetrao urogalloides)..... 192
(Urogallus parvirostris)..... 192
Sagmatorrhina labradorica 44
lathami..... 44
saliceti (Tetrao) 194
salina (Tringa)..... 116, 118
salvadorii (Colymbus)..... 13
sancti-johannis (Archibuteo lagopus)..... 208
saturata (Hirundo).....269, 270, 330
(Hirundo rustica) 330
saturatus kelungensis (Cuculus)..... 228
Saxicola œnanthe..... ..... 226, 349
scandiaca (Nyctea) 221
scapulata (Thalassidroma)..... 97

*Having since discovered that *Hirundo cinerea* is preoccupied by Latham in 1790 for another species, I propose to call the American variety *Clivicola riparia maximiliani*, Prince Max von Wied being the first author to destinguish it. I may add that this form has proportionately larger feet than the European race, while, on the other hand, the latter has a longer wing than its American representative.

Page.

ıxii (Tringa) 120, 121
ıtisagus (Larus) 67, 73, 314, 337, 340
enicius (Emberiza) 322, 337, 346
enicola arundinacea 322
ıpacinus (Gallinago) 110
ıpax alpina 120
cinerea 132
coelestis 110
fusca 129
gallinago 110
glottis 128
incana 132
limosa 131
luzoniensis 138
nebularius 128
pacifica 132
undulata 132
e glu 320
kamtschatkensis 320
s (Megascops) 320
ohmi (Anthus) 274, 275
tum (Anser) 141, 144, 317
arvensis (Anser) 141
middendorffi (Anser) ..141, 144, 317, 338, 341
serrirostris (Anser) 141, 144
ipalmata (Ægialitis) 109
eula (Uria) 23
entrionale (Mormon) 59
entrionalis (Cepphus) 16
(Colymbus) 15
(Eudytes) 16
ica (Pica) 241, 243
(Sitta) 324
ator (Merganser) 177, 178, 318, 336
(Mergus) 178
atus (Mergus) 178
irostris (Anser segetum) 141, 144
ticá (Butalis) 272, 323, 338, 346
(Hemichelidon) 272
(Muscicapa) 272
(Phyllopneuste) 354
ticus (Calamophilus) 324
(Lanius) 323, 337
orhynchus camtschaticus 25
cassini 25
cristatellus 32, 33, 39, 43, 314, 337, 340
psittaculus 38
pusillus 24, 35, 43, 314, 337, 340
pygmæus 24, 25, 26, 33, 34, 35, 42, 43, 45, 314, 337, 340
nasis (Corvus) 239
a albifrons 324, 338, 342
sericea 324
uralensis 324
ıateria cutberti 173
dispar 171
mollissima 66, 173, 174
spectabilis 318, 336, 340
stelleri 170
v-nigra 173, 318, 337, 340
ıtula clypeata 159, 318, 336
ciosa (Montifringilla) 261
ctabilis (Somateria) 318, 336, 340
nus (Fringilla) 354

Page.

Spiza americana 244
squatarola (Charadrius) 103, 316, 336, 349
Squatarola helvetica 103
squatarola (Tringa) 103
stejnegeri (Anthus) 275, 276
stellaris (Ardea) 354
(Botaurus) 354
(Colymbus) 16
stellatus (Colymbus) 15
stelleri (Cyanocitta) 322
(Anas) 170
(Eniconetta) 170, 318, 336, 340
(Somateria) 170
(Polysticta) 170
stenura (Gallinago) 110
Stercorarius buffonii 87
cepphus 87
crepidatus 86
longicaudus 87, 88, 316, 336
parasiticus 86, 87, 88, 94, 316, 336
pomarinus 331, 336, 340
Sterna aleutica 84
arctica 85
camtschatica 83, 315, 338, 341
caspia 84
fissipes 316
glacialis 84
leucoptera 316
longipennis 83, 84, 85
macrura 85
paradisæa 85, 315, 336, 346
streperus (Chaulelasmus) 331
Strepsilas interpres 102
striatus (Colymbus) 16
(Cuculus) 224, 225
Strix brachyotus 220
bubo 354
nisoria 320
nivea 221
nyctea 221
palustris 221
passerina 354
uralensis 354
Stryx accipitrina 220
ægolius 221
barbata 320
Sturnus cinclus 324
subalpinus (Lagopus) 194
(Tetrao) 194
subarquata (Tringa) 120, 349
subbuteo (Falco) 319, 337
(Hypotriorchis) 319
subcerthiola (Locustella) 299
subcristatus (Colymbus) 13
major (Podiceps) 11
(Podiceps) 11
subminuta (Tringa) 116
subminutus (Actodromas) 116
sulphurea melanope (Motacilla) 283
(Motacilla) 283
(Pallenura) 283
superciliata (Phaleris) 33
supercilicsa (Mormon) 25
(Otomela) 323
(Phyllopneuste) 354

	Page.
suecica (Cyanecula)	325, 337, 346
Surnia nyctea	221
ulula*	320, 337, 345
svarbag arra (Lomvia)	18
(Lomvia arra)	18
swinhoei (Cuculus)	224, 225
Sylvia calliope	309, 325
certhiola	299
chloris	302
cyanura	308
eversmanni	302
kamtschatkensis	310
locustella	300
ochotensis	299
sylvicultrix (Phyllopneuste)	302, 304
(Phylloscopus)	302
Synthliboramphus antiquus	23, 314, 337, 340

T.

Tantalus variegatus	138
taczanowskii (Urogallus urogallus)	193
tahitiensis (Numenius)	138, 317
Tarsiger cyanurus	308
telephonus (Cuculus)	224, 226, 228
(Cuculus canorus)	224, 227, 324, 338
temminckii (Actodromas)	116, 117, 119, 316, 337, 346, 349
(Tringa)	116, 118, 119
temmingii (Tringa)	119
temporalis (Motacilla baicalensis)	285
tengmalmi (Nyctala)	223
tenuirostris (Priocella)	91, 96
(Procellaria)	96
(Puffinus)	96, 316, 337, 340
tephrocotis griseinucha (Leucosticte)	261
(Leucosticte)	261
Terekia cinerea	125, 132, 317, 337
guttifera	125
javanica	132
tetracula (Alca)	33, 38
(Phaleris)	33, 38
(Uria)	33
Tetrao albus	194
bonasia	354
camtschaticus	192
canadensis franklinii	354
eremita	193
kamtschaticus	192
lagopus	194
lapponicus	194
parvirostris	192
saliceti	194
subalpinus	194
urogalloides	192
sachalinensis	193
urogallus minor	192
rupestris	192
Thalassidroma furcata	98
leachii	97
scapulata	97
Thalassoœtus pelagicus	212, 213, 217, 320, 338
Thamnobia niveiventris	274
torquata (Bernicla)	149
(Clangula)	166
torquatus adamsii (Colymbus)	14
(Histrionicus)	166
torquilla (Yunx)	354
Totanus acuminatus	115
affinis	130
ater	129, 317, 337
brevipes	137
damacensis	116
fuliginosus	132, 134
fuscus	129
glareola	130, 317, 337
glottis	125, 128
glottoides	128
griseopygius	137
guttifer	124, 127
haughtoni	125
incanus	137
javanicus	133
nebularius	125, 126, 128, 317, 337
nebularius glottoides	128
oceanicus	132
pedestris	132, 137
polynesiæ	132, 136
pulverulentus	137
tridactyla kotzbuei (Rissa)	78
pollicaris (Rissa)	78, 80, 315, 337, 340
(Rissa)	78
(Trynga)	132
tridactylus (Larus)	78
kotzebui (Larus)	78
(Picus)	321
Tringa acuminata	115
albescens	118
alpina	120
alpina americana	120, 121
arenaria	122
australis	115
bonapartei	121
brevipes	132
canutus	354
chinensis	120
cinclus	116, 119, 120, 316
chinensis	120
crassirostris	112, 115, 354
damacensis	116, 119, 120
ferruginea	349
fulicaria	140
fuscicollis	121
glacialis	140
glareola	130
helvetica	108
hyperborea	139
hypoleucos	131
interpres	102
lobata	139
maritima	113
minuta	116, 118
oahuensis	102
pectoralis	115
pugnax	131

* Dall's specimen is No. 41040, U. S. Nat. Mus., Petropaulski, Aug. 20. An examination shows that it in no way differs from Scandinavian examples.

	Page.
wilsonii (Gallinago)	110
(Lobipes)	140

X.

xanthodryas (Phyllopneuste)	304, 325, 338
(Phyllopseustes)	304, 305
(Phyllopseustes borealis)	306
(Phylloscopus)	304

	Page.
Xema sabinii	315
Xenus guttifer	124

Y.

Yunx torquilla	354

Z.

Zonotrichia musica	247

O

	Page.
wilsonii (Gallinago)	110
(Lobipes)	140
X.	
xanthodryas (Phyllopneuste)	304, 325, 338
(Phyllopseustes)	304, 305
(Phyllopseustes borealis)	306
(Phylloscopus)	304
Xema sabinii	315
Xenus guttifer	124
Y.	
Yunx torquilla	354
Z.	
Zonotrichia musica	247

O

1.

2.

Julius Bien

1.

2.

1.

2.

3.

4.

1.

2.

3.

4.

PLATE III.

[Bulletin No. 29, United States National Museum.]

FIG. 1. *Fratercula corniculata*, ♀ ad., summer. U. S. Nat. Mus. No. 89089; Bering Island, May 21, 1882.

FIG. 2. *Fratercula corniculata*, ad., winter. Bering Island, February 24, 1883.

FIG. 3. *Fratercula corniculata*, ♂ jun., winter. U. S. Nat. Mus. No. 92932; Bering Island, February 24, 1883.

1.
2.
3.

PLATE IV.

[Bulletin No. 29, United States National Museum.]

FIG. 1. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92960; Bering Island, December 29, 1882.

FIG. 2. *Simorhynchus pygmæus*, ♀ ad., summer. U. S. Nat. Mus. No. 92972; Bering Island, May 6, 1883.

FIG. 3. *Simorhynchus pusillus*, ♂ ad., summer. U. S. Nat. Mus. No. 92980; Bering Island, December 30, 1882.

FIG. 4. *Simorhynchus cristatellus*, ♀ ad., summer. U. S. Nat. Mus. No. 89096; Bering Island, May 16, 1882.

FIG. 5. *Simorhynchus cristatellus*, ♀ ad., winter. U. S. Nat. Mus. No. 92958; Bering Island, March 1, 1883.

FIG. 6. *Cyclorrhynchus psittaculus*, ♀ ad., summer. U. S. Nat. Mus. No. 92946; Bering Island, May 9, 1883.

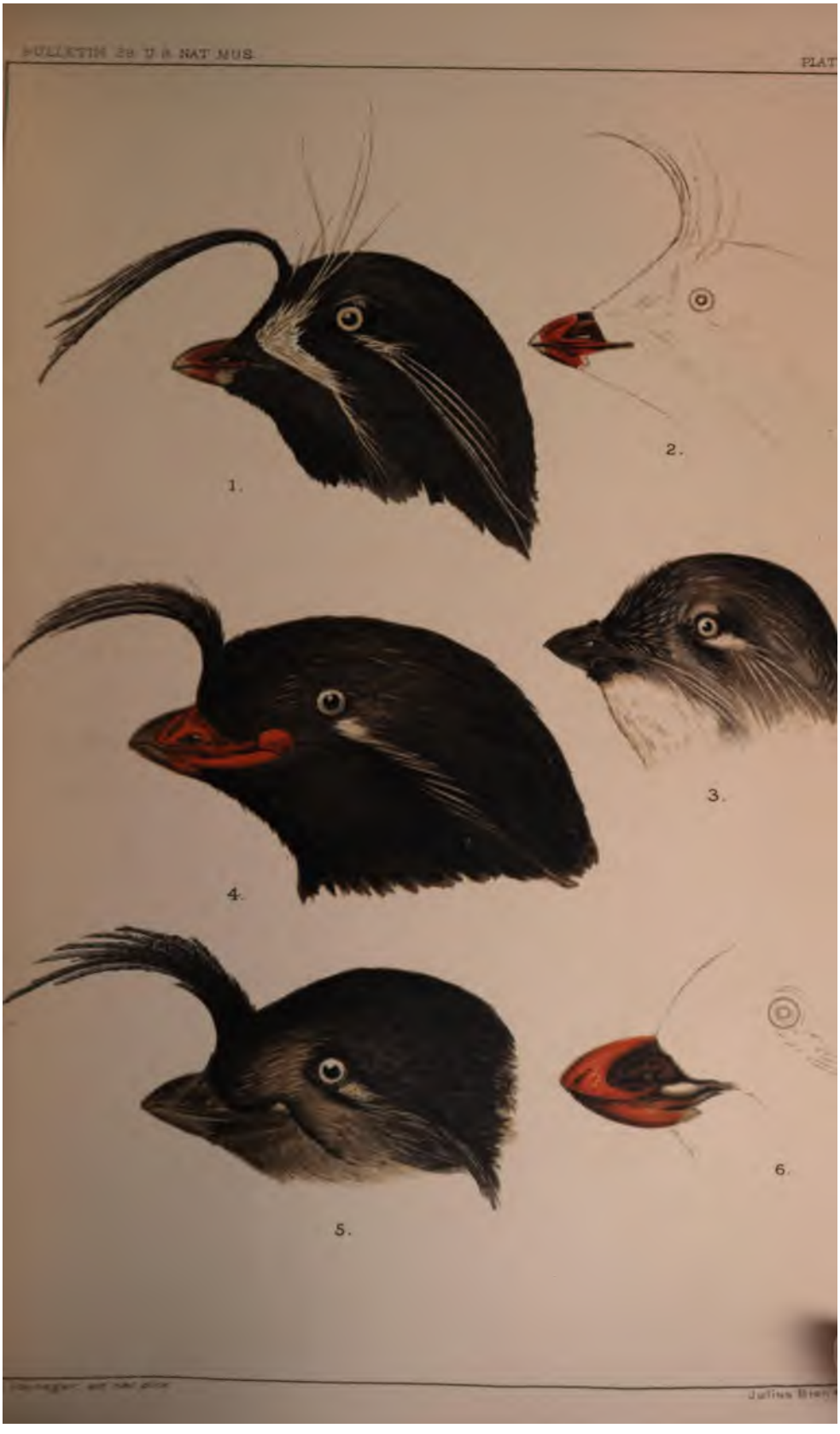

1.
2.
3.
4.
5.
6.

PLATE V.

[Bulletin No. 29, United States National Museum.]

FIG. 1. *Cyclorrhynchus psittaculus*, ♀ ad., summer. U. S. Nat. Mus. No. 89095; Bering Island, July 11, 1882. For explanation of letters see p. 41.

FIG. 2. *Simorhynchus cristatellus*, ♂ ad., summer. U. S. Nat. Mus. No. 92954; Bering Island, June 4, 1883. Mouth opened to show the outline of the rictus.

FIG. 3. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92960; Bering Island, December 29, 1882. Head seen from behind to show the position of the lateral crests.

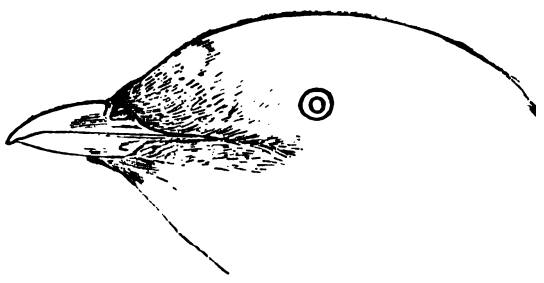
FIG. 4. *Simorhynchus pygmæus*, ♂ ad., winter. U. S. Nat. Mus. No. 92970; Bering Island, January 16, 1883. Mouth open for comparison with Fig 2.

FIG. 5. *Simorhynchus pusillus*, ♂ ad., winter. U. S. Nat. Mus. No. 92980; Bering Island, December 30, 1882. Bill from above.

FIG. 6. *Synthliboramphus antiquus*, ♂ ad. U. S. Nat. Mus. No. 92985; Bering Island, January 3, 1883.

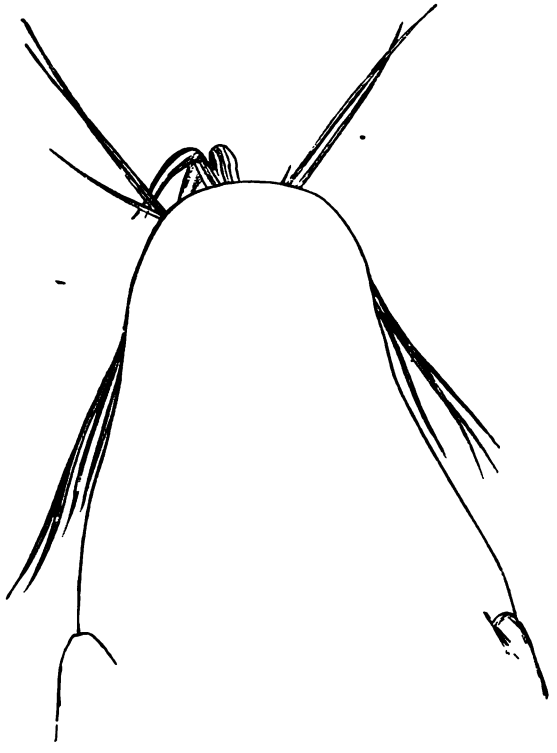
FIG. 7. Same specimen. Bill from above.

1

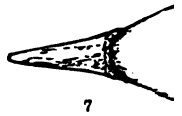


6

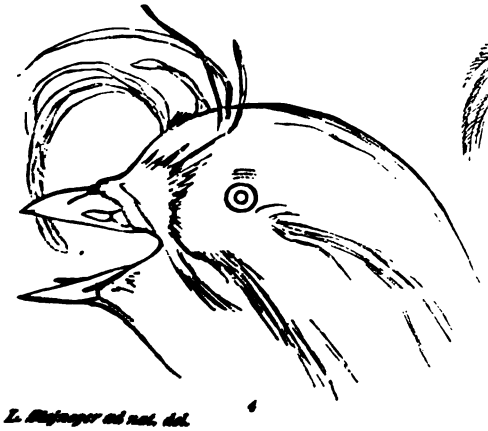
5



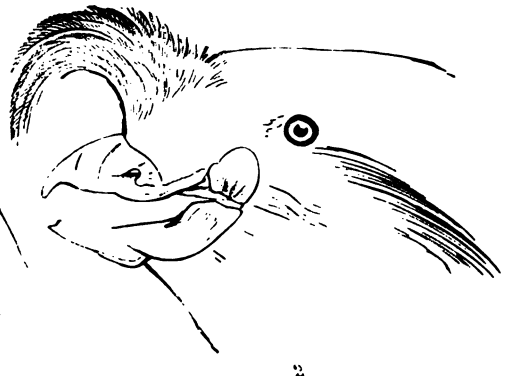
3



7



4



2

L. Stejneger ad nat. del.

1.
2.
3.
4.

PLATE VII.

[Bulletin No. 29, United States National Museum.]

FIG. 1. *Anser segetum middendorffi*, ♂ ad. U. S. Nat. Mus. No. 92824; Bering Island 10, 1883.

FIG. 2. *Anser albifrons gambeli*, ♀ ad. U. S. Nat. Mus. No. 92826; Bering Island 10, 1883.

FIG. 3. *Somateria v-nigra*, ♂ ad. U. S. Nat. Mus. No. 92848; Copper Island, July 3.

1.
2.
3.
4.

PLATE VII.

(All figures from United States National Museum.)

FIG. 1. *Arctocephalus australis* (Zimmermann), ♂ adult. U.S. Nat. Mus. No. 28211, Bering Sea. ½ nat. size.

FIG. 2. *Otocyon cinereus* (Gmelin), ♂ adult. U.S. Nat. Mus. No. 25263, Mazaruni River, British Guiana. ½ nat. size.

FIG. 3. *Sciuropterus nigra*, ♂ adult. U.S. Nat. Mus. No. 92846, Copper Island, Bering Sea. ½ nat. size.

1.

2.

3.

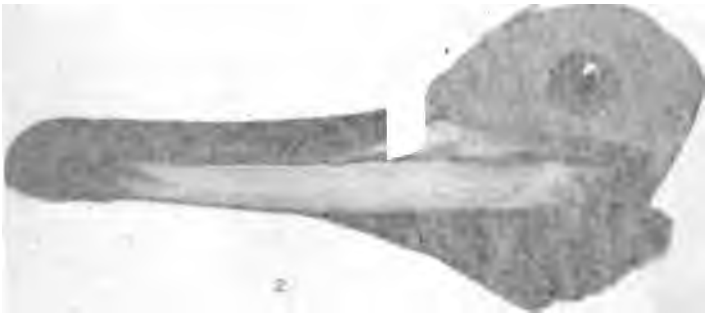
PLATE VIII.

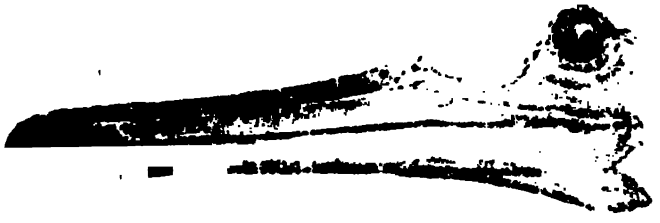
[Bulletin No. 29, United States National Museum.]

FIG. 1. *Phalacrocorax pelagicus*, ♀ ad. U. S. Nat. Mus. No. 92833; Bering Island, April 26, 1883.

FIG. 2. *Phalacrocorax urile*, ♂ ad. U. S. Nat. Mus. No. 92877; Copper Island, July 14, 1883.

FIG. 3. *Phalacrocorax urile*, juv. U. S. Nat. Mus. No. 92878; Copper Island, July 25, 1883.





LELAND STANFORD JUNIOR UNIVERSITY
NOV
14
1891
LIBRARY.

Department of the Interior:
U. S. NATIONAL MUSEUM.

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 30.

BIBLIOGRAPHIES OF AMERICAN NATURALISTS.—
III. PUBLICATIONS RELATING TO FOSSIL INVERTEBRATES.

BY

JOHN BELKNAP MARCOU.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

ADVERTISEMENT.

This work (Bulletin No. 30) is the fortieth of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846. It constitutes the third of the series of bibliographies illustrating the work of the Museum.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

The publications of the National Museum consist of two series—the Bulletins, of which this is No. 30, in continuous series, and the Proceedings, of which the eighth volume is now in press.

The volumes of Proceedings are printed signature by signature, each issue having its own date, and a small edition of each signature is distributed to libraries promptly after its publication.

From time to time the publications of the Museum which have been issued separately are combined together and issued as volumes of the Miscellaneous Collections. These are struck off from the stereotype plates from which the first edition was printed, and in this form are distributed by the Smithsonian Institution to libraries and scientific societies throughout the world. Volume 13 of these collections includes Bulletins 1 to 10, inclusive; volume 19, volumes 1 and 2 of the Proceedings; volume 22, volumes 3 and 4 of the Proceedings; and volume 23, Bulletins 11 to 15, inclusive.

Full lists of the publications of the Museum may be found in the current catalogues of the publications of the Smithsonian Institution.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, December 1, 1885.

BIBLIOGRAPHIES OF AMERICAN NATURALISTS.

III.

BIBLIOGRAPHY OF PUBLICATIONS

RELATING TO

THE COLLECTION OF FOSSIL INVERTEBRATES

IN THE

UNITED STATES NATIONAL MUSEUM,

INCLUDING

COMPLETE LISTS OF THE WRITINGS OF FIELDING B. MEEK, CHARLES A. WHITE, AND CHARLES D. WALCOTT.

BY

JOHN BELKNAP MARCOU.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

CONTENTS.

Page.

Introductory note 7

Part I.—The published writings of Fielding Bradford Meek 9

Part II.—The published writings of Charles Abiathar White 113

Part III.—The published writings of Charles Doolittle Walcott 183

Part IV.—Publications based upon the Paleontological collections of the United States Government by—

	Page.		Page.
Jacob Whitman Bailey	203	Alpheus Hyatt	239
Timothy Abbot Conrad	205	Jules Marcou	241
James Dwight Dana	223	John Strong Newberry	245
Christian Gottfried Ehrenberg	229	David Dale Owen	247
James Hall	231	James Schiel	253
Angelo Heilprin	237	Benjamin F. Shumard	255
		Robert Parr Whitfield	259

Supplement 273

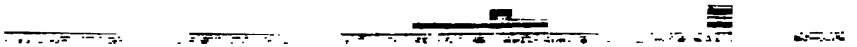
	Page.		Page.
J. W. Bailey	273	Hiram A. Prout	273
T. N. Nicollet	273	Benjamin F. Shumard	274

Index of genera and species 275

General Index 327

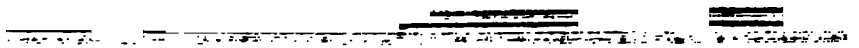
INTRODUCTORY NOTE.

In preparing the following catalogues chronologic order has been followed under the different authors, and in Part IV the fifteen different authors are arranged, first, alphabetically and then chronologically under each author. Correctness of bibliographic form and detail has not been so much sought after as completeness and accuracy in the numerous references. A general alphabetic index of species will be found at the end of the volume. The compiler will be glad to have his attention called to any errors or omissions. Dr. White's bibliography is prepared from data furnished by himself. I am much indebted to Dr. White for his kind advice and help in the preparation of the work.



PART I.

THE PUBLISHED WRITINGS OF FIELDING BRADFORD MEEK.



1.—THE PUBLISHED WRITINGS OF FIELDING BRADFORD MEEK.

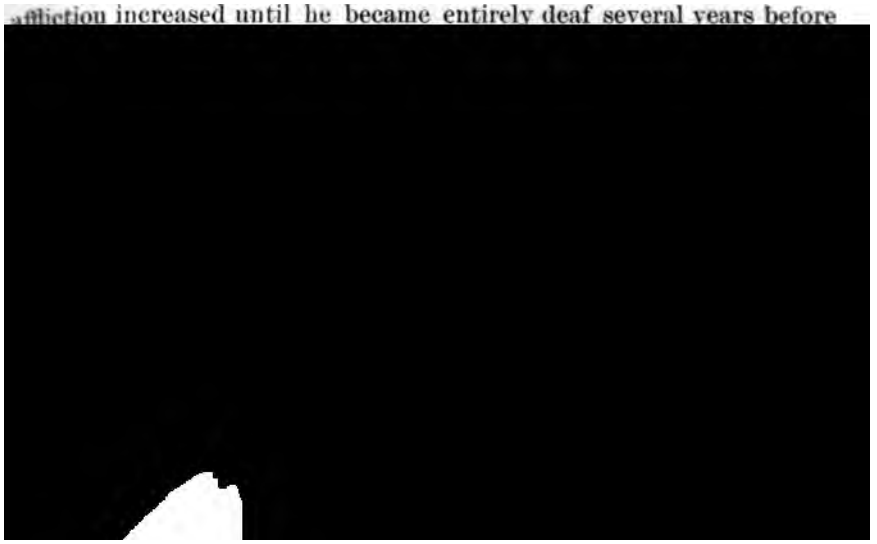
BIOGRAPHIC SKETCH OF FIELDING BRADFORD MEEK.*

On December 10, 1817, Fielding Bradford Meek was born in the city of Madison, Ind. His grandparents were Irish Presbyterians, who removed from Armagh County to America about 1768, and who finally settled in Hamilton County, Ohio. His father, together with his family, removed from there to Madison, where he was a lawyer of considerable eminence. The family, including those born in Madison, consisted of the parents, two sons and two daughters besides Fielding, all of whom died several years before him. The father died when the son who was to become so distinguished a paleontologist was only three years old, leaving the family in moderate circumstances. Mr. Meek's early youth was passed in Madison. His education was much impeded by the delicate condition of his health. Upon reaching manhood, by advice of his friends and against his own inclination, for he was of a studious and retiring disposition, he invested his small patrimony in mercantile business, first in his native place, and afterward in Owensborough, Ky. The result was financial failure and loss of all he possessed. After this, while laboring for his support and struggling with ill health and poverty, he continued his studies, general and special, for he began early to devote himself to natural history. His first public work was during the years 1848 and 1849, and was performed, as an assistant of Dr. D. D. Owen, upon the United States geological survey of Iowa, Wisconsin, and Minnesota.

Having closed this work, he returned to his home in Owensborough, but soon after, in the year 1852, went to Albany, N. Y., as assistant to Professor Hall, in the paleontologic work of that State. He remained there until 1858, serving three summers. Two of these summers were spent on the geologic survey of Missouri; the other, that of 1853, was employed in exploring the Bad Lands of Nebraska, together with Dr. F. V. Hayden, both being commissioned by Professor Hall for that work. Three

*This sketch is compiled from data taken down at Mr. Meek's dictation by a friend shortly before his death.

years after this exploration, he prepared for publication, in conjunction with Professor Hall, an important memoir on cretaceous fossils from Nebraska. In 1858, Mr. Meek left Albany and took up his residence in Washington, where he continued to live until his death. His home, and the place of his scientific work, except when in the field, was at the Smithsonian Institution, and it was within its walls that the greatest part of his scientific work was accomplished. The association which he formed with Dr. Hayden in 1853 was tacitly continued until Mr. Meek's death. When Dr. Hayden commenced his explorations in the Western Territories, and afterwards organized the Geological Survey of the Rocky Mountain region, Mr. Meek was entrusted with all the invertebrate paleontology, much of which appeared under their joint names. It was the custom of Mr. Meek to publish preliminary descriptions of his new species, and afterward elaborate and illustrate the subjects for final publication. Thoroughness, scrupulous exactness, and nice powers of discrimination are manifested in all his labors; and with such merits his works will shed luster upon his name as long as paleontology is studied. No one in America has done more than he to systematize and advance the science to which he devoted his life. His personal character cannot be too highly eulogized, for it was without a blemish. He was a genial, sincere, pure-minded, honorable man. Gentleness and candor were apparent in every expression of his face, and in every word he uttered; but he was self-reliant and ready at all times to defend what he believed to be right, and with his keen sense of justice, he was seldom mistaken as to what was right. He was never in vigorous health and often ill; but never complaining, always hopeful, always cheerful, always at the work he loved so well, always helpful of others. His hearing began to fail in early manhood, and the affliction increased until he became entirely deaf several years before



1.

MEEK, F. B. Mr. Meek's report on Mouiteau County. <The first and second annual reports of the geological survey of Missouri, by G. C. Swallow, State geologist. Part II. pp. 96–117. Jefferson City, 1855.

CONTENTS OF THE REPORT.

	Page.
Quaternary deposits	96
Carboniferous system.—Encrinital limestone	98
Chemung group	101
Devonian system.—Upper Helderberg.—Onondaga limestone	103
Lower Silurian strata:	
Saccharoidal sandstone	105
Second magnesian limestone	106
Economical geology:	
Soil	109
Building stones	110
Fire-stones, limestones for lime	110
Sand for making mortar, hydraulic limestone, millstones, materials for the construction of roads, clays for the manufacture of bricks	111
Coal	112
Iron ore	115
Lead	115
High-Point Mine	117

Mr. Meek also drew the figures illustrating the paleontological report in this volume. A geological map of the county is also given.

2.

HALL, JAMES, *and* MEEK, F. B Descriptions of new species of fossils from the Cretaceous formations of Nebraska; with observations upon Baculites ovatus and B. compressus, and the progressive development of the septa in Baculites, Ammonites, and Scaphites. <Mem. Am. Acad. Arts and Sci., vol. v, new ser., pp. 379–411, 8 plates. 1856. Cambridge, 1856.

The fossils described in this paper were collected in 1853 by F. B. Meek and F. V. Hayden. The paper was communicated June 27, 1854, but was not published till 1856.

	Page.
Callianassa danai, n. s., H. & M., 1856, pl. i, fig. 1 *a*, *b*	379–380
Lingula subspatulata, n. s., H. & M., 1856, pl. i, figs. 2 *a*, *b*	380
Caprinella coraloidea, n. s., H. & M., 1856, pl. ii, figs. 3 *a–f*	380–381
Pecten rigida, n. s., H. & M., 1856, pl. ii, figs. 4 *a–c*	381
Arieula haydeni, n. s., H. & M., 1856, pl. i, figs. 5 *a*, *b*	382
Lucina subundata, n. s., H. & M., 1856, pl. i, figs. 6 *a*, *b*	382
Cytherea orbiculata, n. s, H. & M., 1856, pl. i, fig. 7	382–383
Cytherea tenuis, n. s., H. & M., 1856, pl. i, figs. 8 *a–c*	383
Crassatella evansii, n. s., H. & M., 1856, pl. i, figs. 9 *a–c*	383–384
Pectunculus nioxensis, n. s., H. & M., 1856, pl. i, fig. 12	384
Nucula subnasuta, n. s., H. & M., 1856, pl. i, figs. 10 *a–c*	384–385
Nucula ventricosa, n. s., H. & M., 1856, pl. i, fig. 11 *a*, *b*	385
Capulus occidentalis, n. s., H. & M., 1856, pl. i, fig. 13 *a–d*	385–386
Inoceramus sublævis, n. s., H. & M., 1856, pl. ii, fig. 1 *a*, *b*	386
Inoceramus convexus, n. s., H. & M., 1856, pl. ii, fig. 2 *a*, *b*	386–387
Inoceramus tenuilineatus, n. s, H. & M., 1856, pl. ii, fig. 3 *a*, *b*	387
Inoceramus conradi, n. s., H. & M., 1856, pl. ii, fig. 5 *a*, *b*	387–388
Inoceramus fragilis, n. s., H. & M., 1856, pl. ii, figs. 6 *a*, *b*	388
Natica obliquata, n. s., H. & M., 1856, pl. iii, figs. 1 *a*, *b*	389
Natica concinna, n. s., H. & M., 1856, pl. iii, figs. 2 *a–d*	389
Natica paludinæformis, n. s., H. & M., 1856, pl. iii, fig. 3 *a–c*	389–390
Acteon concinnus, n. s., H. & M., 1856, pl. iii, figs. 4 *a–d*	390
Buccinum? vinculum, n. s., H. & M., 1856, pl. iii, figs. 5 *a–b*	390–391
Fusus shumardii, n. s., H. & M., 1856, pl. iii, figs. 6 *a–c*	391
Fusus constrictus, n. s., H. & M., 1856, pl. iii, figs. 7 *a–d*	391–392
Fusus? tenuilineata, n. s., H. & M. 1856, pl. iii, figs. 8 *a–c* and 9 *a–c*	
Rostellaria fusiformis, n. s, H. & M., 1856, pl. iii, fig. 10 *a*, *b*	
Dentalium gracile, n. s., H. & M., 1856, pl. iii, fig. 11 *a–c*	

Pa...
... 394
... 394–...
... 396
... 396–397
... 397–398
... 398–399
... 399–403
... 403–4...
... pl. vi, fig. 10 403–4...
... the Missouri
... 40...
... formation of
... 40...
... and New Jersey 40...
... 40...
... 42...

...is referred to the genus *Buccinum*.

...regarded as belonging to the genus *Ancylocera* ... defined by Pictet.

3.

... GABB, W. M. Descriptions of ... -pteropoda, fr...
... formation of Nebraska Territ... Nat. Sci. Phil...
... 1859. Philadelphia, 1859

Pa...
... M. & H. 1859 ...
... M. & H. 1859 ... 53—
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ... 54—
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ...
... M. & H. 1859 ...

	Page.
Belemnitella? bulbosa, n. s., M. & H., 1857	70
Ammonites halli, n. s., M. & H., 1857	70–71
Ancyloceras? nebrascensis, n. s., M. & H., 1857	71
Ancyloceras? cheyenensis, n. s., M. & H., 1857	71–72

5.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of twenty-eight new species of Acephala and one Gasteropod, from the Cretaceous formations of Nebraska Territory. <Proc. Acad. Nat. Sci. Phila., vol. viii, pp. 81–87. 1856. Philadelphia, 1857.

	Page.
Pholadomya undata, n. s., M. & H., 1856	81
Goniomya americana, n. s., M. & H., 1856	81–82
Solen subplicatus, n. s., M. & H., 1856	82
Tellina gracilis, n. s., M. & H., 1856	82
Tellina equilateralis, n. s., M. & H., 1856	82
Tellina? cheyenensis, n. s., M. & H., 1856	82
Tellina scitula, n. s., M. & H., 1856	82
Tellina subelliptica, n. s., M. & H., 1856	83
Tellina prouti, n. s., M. & H., 1856	83
Cytherea deweyi, n. s., M. & H., 1856	83
Cytherea nebrascensis, n. s., M. & H., 1856	83
Corbula ventricosa, n. s., M. & H., 1856	83
Corbula moreauensis, n. s., M. & H., 1856	83–84
Corbula? gregaria, n. s., M. & H., 1856	84
Astarte gregaria, n. s., M. & H., 1856	84
Nucula scitula, n. s., M. & H., 1856	84
Nucula evansi, n. s., M. & H., 1856	84
Nucula equilateralis, n. s., M. & H., 1856	84–85
Nucula subplana, n. s., M. & H., 1856	85
Nucula cancellata, n. s., M. & H., 1856	85
Nucula planomarginata, n. s., M. & H., 1856	85
Pectunculina parvula, n. s., M. & H., 1856	85
Arca (Cucullæa) cordata, n. s., M. & H., 1856	86
Arca (Cucullæa) shumardi, n. s., M. & H., 1856	86
Mytilus attenuatus, n. s., M. & H., 1856	86
Avicula? fibrosa, n. s., M. & H., 1856	86–87
Inoceramus ventricosus, n. s., M. & H., 1856	87
Pecten nebrascensis, n. s., M. & H., 1856	87
Natica suberassa, n. s., M. & H., 1856	87

6.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new species of Acephala and Gasteropoda, from the Tertiary formations of Nebraska Territory; with some general remarks on the geology of the country about the sources of the Missouri River. <Proc. Acad. Nat. Sci. Phila., vol. viii, pp. 111–126. 1856. Philadelphia, 1857.

	Page.
Formations immediately beneath the Tertiary in this district	113
Formations at the base of the Cretaceous of this district	114
Cyclas formosa, n. s., M. & H., 1856	115
Cyclas fragilis, n. s., M. & H., 1856	115
Cyclas subellipticus, n. s., M. & H., 1856	115
Cyrena moreauensis, n. s., M. & H., 1856	115–116
Cyrena intermedea, n. s., M. & H., 1856	116
Cyrena occidentalis, n. s., M. & H., 1856	116
Corbula subtrigonalis, n. s., M. & H., 1856	116
Corbula perundata, n. s., M. & H., 1856	116
Corbula mactriformis, n. s., M. & H., 1856	117
Unio priscus, n. s., M. & H., 1856	
Bulimus? teres, n. s., M. & H., 1856	
Bulimus? vermiculus, n. s., M. & H., 1856	

Page.

Bulimus limneaformis, n. s., M. & H., 1856 118
Bulimus nebrascensis, n. s., M. & H., 1856 118
Puxa helicoides, n s., M. & H., 1856 118–119
Limnæa tenuicosta, n. s., M. & H., 1856 119
Physa longiuscula, n s., M. & H., 1856 119
Physa rhomboidea, n. s., M. & H., 1856 119
Physa nebrascensis, n. s., M. & H., 1856 119–120
Physa subelongata, n. s , M. & H., 1856 120
Planorbis subumbilicatus, n. s., M. & H., 1856 120
Planorbis corculatus, n. s., M. & H., 1856 120
Velletia (Ancylus) minuta, n. s., M. & H., 1856 120
Paludina multilineata, n. s., M. & H., 1856 120–121
Paludina retula, n. s., M. & H., 1856. 121
Paludina leai, n. s., M. & H., 1856 121–122
Paludina retusa, n. s., M. & H., 1856 122
Paludina conradi, n. s., M. & H., 1856 122
Paludina peculiaris, n s , M. & H., 1856 122
Paludina trochiformis, n. s., M. & H., 1856 122–123
Paludina leidyi, n. s , M. & H., 1856 123
Valvata parvula, n. s., M. & H., 1856 123
Melania minutula, n. s., M. & H., 1856 123–124
Melania anthonyi, n. s., M. & H., 1856 124
Melania multistriata, n. s., M. & H., 1856 124
Melania nebrascensis, n. s., M. & H., 1856 124–125
Melania conexa, n. s.; M. & H , 1856 125
Cerithium nebrascensis, n. s , M. & H., 1856 125

On page 126 *Pyrula bairdi* is changed to Busycon (Bolton), and called *B. bairdi*.

7.

MEEK, F. B., *and* HAYDEN, F. V. **Descriptions of new fossil species of Mollusca collected by Dr. F. V. Hayden in Nebraska Territory, together with a complete catalogue of all the remains of Invertebrata hitherto described and identified from the Cretaceous and Tertiary formations of that region.** <Proc. Acad. Nat. Sci. Phila., vol. viii, pp. 265–286. 1856. Philadelphia, 1857.

Page

Vertical section of the geological formation of Nebraska Territory, so far as determined 269
Natica tuomyana, n. s., M. & H., 1856 270
Bulla subcylindrica, n. s., M. & H., 1856 270
Panopæa occidentalis, n. s., M. & H., 1856 270
Mactra formosa, n. s., M. & H., 1856 271
Mactra warrenana, n. s., M. & H., 1856 271
Mactra alta, n. s., M. & H , 1856 271–272
Tellina subtortuosa, n. s., M. & H., 1856 272
Venus? circularis, n. s., M. & H., 1856 272
Cytherea pellucida, n. s., M. & H., 1856 272–273
Cytherea evenana, n. s , M. & H., 1856 273
Lucina occidentalis, n. s , M. & H., 1856 273–274
Hettangia americana, n. s., M. & H., 1856 274
Cardium speciosum, n. s., M. & H., 1856 274–275
Nucula obsoletastriata, n. s., M. & H., 1856 275
Cucullæa exigua, n. s., M. & H., 1856 275–276
Mytelus subarcuatus, n. s., M & H , 1856 276
Gervilia subtortuosa, n. s., M. & H., 1856 276
Inoceramus pertenuis, n s., M. & H., 1856 276–277
Inoceramus incurvus, n. s , M. & H., 1856 277
Ostrea patina, n. s., M. & H., 1856 277
Catalogue of all the invertebrate fossil remains hitherto described and identified, from the Tertiary and Cretaceous formations of Nebraska Territory 278
Tertiary species 278
Cretaceous species 280

8.

MEEK, F. B. Description of new organic remains from the Cretaceous rocks of Vancouver's Island. <Trans. Albany Inst., vol. iv, pp. 37–49. 1857. Albany, 1858–1864.

The fossils here described were collected by Dr. J. S. Newberry, geologist of Lieutenant Williamson's North California and Oregon Exploring Expedition. The author describes twelve new species.

	Page.
Nucula traskana, n. s., Meek, 1857	39
Area (*Cucullæa*) *equilateralis*, n. s., Meek, 1857	39–40
Area vancouverensis, n. s., Meek, 1857	40
Cardium scitulum, n. s., Meek, 1857	40–41
Pa[*o*]*ladomya* (*Goniomya*) *borealis*, n. s., Meek, 1857	41–42
Pa[*o*]*ladomya subelongata*, n s., Meek, 1857	42
Trigonia evansana, n. s., Meek, 1857	43
Thracia? occidentalis, n. s., Meek, 1857	43–44
Thracia? subtruncata, n. s., Meek, 1857	44
Dentalium nanaimoensis, n. s., Meek, 1857	44–45
Ammonites (*Scaphites?*) *ramosus*, n. s., Meek, 1857	45–47
Ammonites newberryanus, n. s., Meek, 1857	47–48
Baculites ovatus? (Say)	48–49

Mr. Meek gives the date of these species as 1857 when he republished them with illustrations in the Bull. U. S. Geol. and Geogr. Surv. Terr., vol. ii, No. 4. Washington, 1876.

9.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new species and genera of fossils collected by Dr. F. V. Hayden in Nebraska Territory, under the direction of Lieut. G. K. Warren, U. S. Topographical Engineers; with some remarks on the Tertiary and Cretaceous formations of the Northwest and the parallelism of the latter with those of other portions of the United States and Territories. <Proc. Acad. Nat. Sci. Phila., 1st series, vol. ix, pp. 117–148. 1857. Philadelphia, 1858.

Genera Pseudobuccinum, Corbulamella.

	Page.
Gives a brief account of the results of previous explorations	117–121
Section of Tertiary beds thirteen miles above Fort Clark	122
Section of fresh-water and estuary deposits near the mouth of Judith River	124
Section of the older deposits at the mouth of Judith River, in the descending order	125
Alabama section, from facts communicated by Prof. A. Winchell	126
New Jersey section, compiled from the reports of that State	127
Vertical section of the geological formations of Nebraska Territory, so far as determined	128
Sections of the rocks in Northeastern Kansas (above the Coal Measures). By Major F. Hawn, U. S. deputy surveyor	130
Section of the formations at Pyramid Mountain, New Mexico [by Jules Marcou]	132
Conclusions	133
Ptychoceras mortoni, n. s., M. & H., 1857	134
Scrpula? tenuicarinatus, n. s., M. & H., 1857	134
Vitrina obliqua, n. s., M. & H., 1857	134
Helix occidentalis, n. s., M. & H., 1857	135
Helix vitrinoides, n. s., M. & H., 1857	135
Planorbis tenuivolvis, n. s., M. & H., 1857	135
Planorbis amplexus, n. s., M. & H., 1857	135–136
Planorbis fragilis, n. s., M. & H., 1857	136
Melania subtortuosa, n. s., M. & H., 1857	136
Melania omitta, n. s., M. & H., 1857	136
Melania sublævus, n. s., M. & H., 1857	136–137
Melania inconusta, n. s., M. & H., 1857	137
Melania warrenana, n. s., M. & H., 1857	
Melania tenuicarinata, n. s., M. & H., 1857	
Melania convexa, M. & H.	
Pyrgu vaughani, n. s., M. & H., 1857	
Pyrgu subturritus, n. s., M. & H., 1857	

	Page.
Psammobia interlineata, n. s., M. & H., 1857	139
Psammobia (Pleurolema?) scarburoughi, n. s., M. & H., 1857	139–140
Psammobiacinum, n. g., M. & H., 1857	140
Psammobiacinum tetrazonaria, M. & H.	140–141
Ipsiphaga elegantula, n. s., M. & H., 1857	141
Ipsiphaga simpsoni, n. s., M. & H., 1857	141–142
Phasianema subcentricosa, n. s., M. & H., 1857	142
Scissa? dakotensis, n. s., M. & H., 1857	142
Corbulamella, n. g., M. & H., 1857	142–143
Corbulamella gregaria, M. & H.	143
Cyprina armaria, n. s., M. & H., 1857	143
Cyprina cordata, n. s., M. & H., 1857	143
Cyprina compressa, n. s., M. & H., 1857	144
Cyprina subtrunoida, n. s., M. & H., 1857	144
Cyprina crata, n. s., M. & H., 1857	144
Unio dunei, n. s., M. & H., 1857	145
Unio dravyanus, n. s., M. & H., 1857	145–146
Unio subplanatulata, n. s., M. & H., 1857	146
Pectunculus subimbricatus, n. s., M. & H., 1857	146
Ostrea glabra, n. s., M. & H., 1857	146–147
Ostrea translucida, n. s., M. & H., 1857	147
Hemiaster? humphreysanus, n. s., M. & H., 1857	147–148

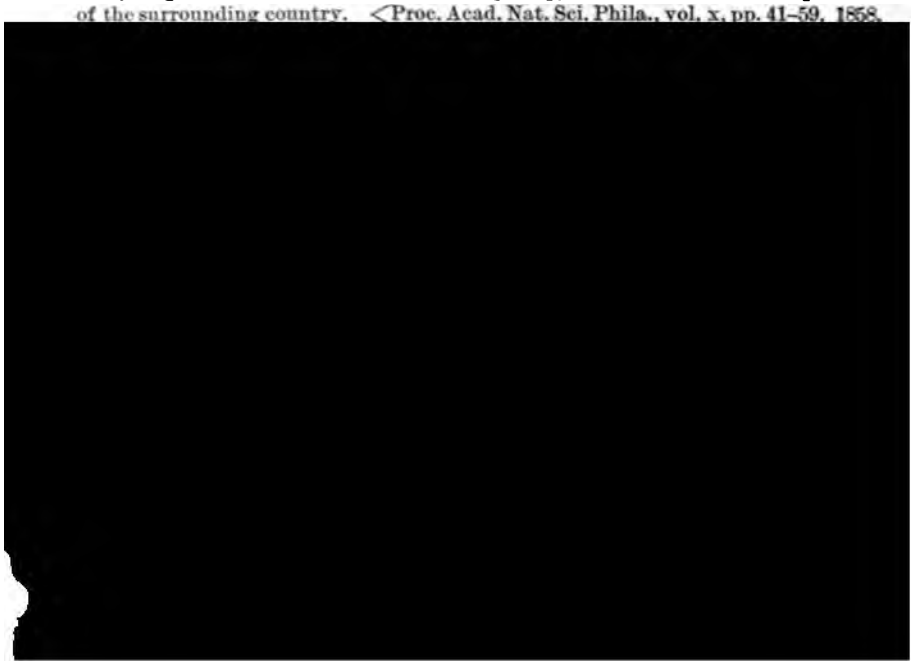
10.

MEEK, F. B., *and* HAYDEN, F. V. Fossils of Nebraska. Letter from F. B. Meek and F. V. Hayden to G. K. Warren, Lieut. Topog. Eng., dated Washington February 8, 1858; printed in the National Intelligencer of March 16. <Am. Journ. Sci., vol. XXV, 2d ser., pp. 439–442. New Haven, 1858.

This article is mainly geologic, only the genera, which characterize the formations under discussion, being enumerated.

11.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new organic remains collected in Nebraska Territory, in the year 1857, by Dr. F. V. Hayden, geologist to the exploring expedition under the command of Lieut. G. K. Warren, Top. Eng., U. S. Army; together with some remarks on the geology of the Black Hills and portions of the surrounding country. <Proc. Acad. Nat. Sci. Phila., vol. x, pp. 41–59, 1858.



	Page.
Helicoceras tenuicostatus, n. s., M. & H., 1858	56
Ancyloceras (Hamites) uncus, n. s., M. & H., 1858	56–57
Ammonites cordiformis, n. s., M. & H., 1858	57
Ammonites henryi, n. s., M. & H., 1858	57–58
Scaphites larvæformis, n. s., M. & H., 1858	58
Belemnites densus, n. s., M. & H., 1858	58–59

12.

MEEK, F. B., *and* HAYDEN, F. V. Remarks on the Lower Cretaceous beds of Kansas and Nebraska, together with descriptions of Carboniferous fossils from the valley of Kansas River. <Proc. Acad. Nat. Sci. Phila., vol. x, pp. 256–264. 1858. Philadelphia, 1859.

	Page.
Description of new Carboniferous fossils	260
Fusulina cylindrica, Fischer	260–261
F. cylindrica var. *ventricosa*, M. & H., 1858	261
Orthisina crassa, n. s., M. & H., 1858	261
Chonetes mucronata, n. s., M. & H., 1858	262
Azinus (Schizodus) ovatus, n. s., M. & H., 1858	262
Allorisma? altirostrata, n. s., M. & H., 1858	263
Allorisma subcuneata, n. s., M. & H., 1858	263
Allorisma? leavenworthensis, n. s., M. & H., 1858	263–264
Allorisma? cooperi, M. & H., (1858)	264
Pleurotomaria subturbinata, n. s., M. & H., 1858	264
Pleurotomaria humerosa, n. s., M. & H., 1858	264

13

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new organic remains from Northeastern Kansas, indicating the existence of Permian rocks in that territory. <Trans. Albany Institute, vol. iv, pp. 73–88. 1858. Albany, 1858–1864.

This includes a note in relation to the priority of discovery of these fossils of Permian type.

DESCRIPTIONS OF FOSSILS.

	Page.
Monotis hawni, n. s., M. & H., 1858	76–77
Myalina (Mytilus) perattenuata, n. s., M. & H., 1858	77–78
Bakevellia parva, n. s., M. & H., 1858	78–79
Leda (Nucula) subcitula, n. s., M. & H., 1858	79
Edmondia? calhouni, n. s., M. & H., 1858	80
Pleurophorus? occidentalis, n. s., M. & H., 1858	80–81
Pleurophorus? (Cardinea) subcuneata, n. s., M. & H., 1858	81–82
Lyonsia (Panopæa) concava, n. s., M. & H., 1858	82–83
Panopæa cooperi, n. s., M. & H., 1858	83
Nautilus eccentricus, n. s., M. & H., 1858	83–84

14

MEEK, F. B., *and* HAYDEN, F. V. Geological explorations in Kansas Territory. <Proc. Acad. Nat. Sci. Phila., vol. xi, pp. 8–30. 1859. Philadelphia, 1860.

	Page.
General section of the rocks of Kansas valley from the Cretaceous down, so as to include portions of the upper Coal measures	16–18
List of the species mentioned in this paper, with some remarks on the synonymy, and references to the works in which they are described	24–30
Foraminifera	24
Fusulina cylindrica, Fischer	24
Fusulina cylindrica var ventricosa, M. & H	24
Bryozoa	24
Syncladia biserialis, Swallow	24
Acanthocladia americana, Swallow	24
Echinodermata	24
Cyathocrinus ——?	
Archæocidaris ——?	
Archæocidaris ——?	

Brachiopoda
Discina tenuilineata, n. s., M. & H., 1859
D. manhattanensis, n. s., M. & H., 1859
Productus splendens (?) Norwood & Pratten
P. norwoodi, Swallow
P. rogersi, Norwood & Pratten
P. pustulosus (?), Phillips
P. prattenianus, Norwood
P. calhounianus, Swallow
Chonetes vernuiliana, Norwood & Pratten
C. mucronata, M. & H., 1858
Orthisina crassa, M. & H., 1858
O. umbraculum?, Schlot sp.
O. missouriensis, Swallow
O. shumardiana, Swallow
Terebratula millepunctata, Hall
Rhynchonella uta, Marcou
Retzia mormonii, Marcou
Spirifer kentuckensis, Shumard
S. cameratus, Morton
S. hemiplicata, Hall
S. lineatus, Phillips
Spirifer, ——
S. planoconvexa, Shumard
Spirigera subtilita, Shumard
Spirigera ——?
Lamellibranchiata
Monotis hawni, M. & H., 1858
Myalina (*Mytilus*) *perattenuata*, M. & H., 1858
Myalina squamosa (J. de C.) Sowerby
M. subquadrata, Shumard
Edmondia? *calhouni*, M. & H., 1858
Bakevellia parva, M. & H., 1858
Arca carbonaria, Cox
Leda subscitula, M. & H., 1858
Pleurophorus? *subcuneata*, M. & H., 1858
Axinus (*Schizodus*) *ovatus*, M. & H., 1858
Axinus rotundatus, Brown
Allorisma? *leavenworthensis*, M. & H., 1858
A. subcuneata, M. & H., 1858
A.? *altirostrata*, M. & H., 1858
A.? *cooperi*, M. & H., 1858
Leptodomus granosus, Shumard
Gasteropoda
Pleurotomaria humerosa, M. & H., 1858
P. subturbinata, M. & H., 1858
Bellerophon ——?
Euomphalus ——?
Cephalopoda
Nautilus eccentricus, M. & H., 1858
Fishes
Xystracanthus arcuatus, Leidy
Cladodus occidentalis, Leidy
Petalodus alleghaniensis, Leidy

15.

MEEK, F. B., *and* HAYDEN, F. V. On a new genus of Patelliform shells from Cretaceous rocks of Nebraska. <Am. Journ. Sci., vol. xxix, 2d ser., pp. 33 plate i. 1860. New Haven, 1860.

Genus Anisomyon,* n. g., M. & H., 1860.

Anisomyon patelliformis, M. & H., pl. i, figs. 1–3

*Ανισος, unequal; μυών, muscle; in allusion to the unsymmetrical muscular scar.

Page.

The authors refer the following Nebraska species to this genus:
Anisomyon borealis (=*Hipponyx borealis*, Morton, 1842, =*Helcium carinatum*, M. & H., 1856) 35
Anisomyon sexrulcatus (=*Helcium sexrulcatum*, M. & H.) 35
Anisomyon alveolus (=*Helcium alveolum*, M. & H.) 35
Anisomyon patelliformis (=*Helcium patelliforme*, M. & H.) 35
Anisomyon subovatus (=*Helcium subovatum*, M. & H.) 35

16.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new organic remains from the Tertiary, Cretaceous, and Jurassic rocks of Nebraska. <Proc. Acad. Nat. Sci. Phila., vol. xii, pp. 175–184. 1860. Philadelphia, 1861.

A description of the Carboniferous species *Myalina aviculoides* is also added; also a corrected list of fossils.

TERTIARY SPECIES.

Page.

Gasteropoda 175
Helix evansi, n. s., [M.] & H., 1860 175
Planorbis vetulus, n. s., M. & H., 1860 175
Planorbis leidyi, n. s., M. & H., 1860 175
Conchifera 175
Sphærium planum, n. s., M. & H., 1860 175–176
Sphærium recticardinale, n. s., M. & H., 1860 176
Cyrena (*Corbicula?*) *cytheriformis*, n. s., M. & H., 1860 176

CRETACEOUS SPECIES.

Cephalopoda 176
Phylloteuthis, n. g., M. & H., 1860 176
Phylloteuthis subovatus, n. s., M. & H., 1860 176
Helicoceras angulatum, n. s., M. & H., 1860 176
Ammonites placenta var. *intercalaris*, M. & H 177
Ammonites vermilionensis, n. s., M. & H., 1860 177
Scaphites nodosus var. *plenus*, M. & H 177–178
Gasteropoda 178
Aporrhais parva, n. s., M. & H., 1860 178
Aporrhais sublevis, n. s., M. & H., 1860 178
Dentalium pauperculum, n. s., M. & H., 1860 178
Cylichna scitula, n. s., M. & H., 1860 178
Conchifera 178
Teredo selliformis, n. s., M. & H., 1860 178–179
Mactra siouxensis, n. s., M. & H., 1860 179
Mactra gracilis, n. s., M. & H., 1860 179
Tellina? formosa, n. s., M. & H., 1860 179
Cyprina humilis, n. s., M. & H., 1860 179–180
Avicula subgibbosa, n. s., M. & H., 1860 180
Inoceramus cuneatus, n. s., M. & H., 1860 180
Inoceramus vanuxemi, n. s., M. & H., 1860 180
Inoceramus balchii, n. s., M. & H., 1860 180–181
Inoceramus subcompressus, n. s., M. & H., 1860 181
Inoceramus aviculoid[s]s, n. s., M. & H., 1860 181
Anomia obliqua, n. s., M. & H., 1860 181
Anomia subtrigonalis, n. s., M. & H., 1860 181
Ostrea inornata, n. s., M. & H., 1860 181–182

JURASSIC SPECIES.

Conchifera 182
Pholadomya humilis, n. s., M. & H., 1860 182
Myacites nebrascensis, n. s., M. & H., 1860 182
Thracia? sublevis, n. s., M. & H., 1860 182
Thracia? arcuata, n. s., M. & H., 1860 .....
Cardium shumardi, n. s., M. & H., 1860 .....
Tancredia? æquilateralis, n. s., M. & H., 1860 .....
Tancredia warrenana, n. s., M. & H., 1860 .....

Page.
Astarte fragilis, n. s., M. & H., 1860 183
Astarte inornata, n. s., M. & H., 1860 183
Trigonia conradi, n. s., M. & H., 1860 183-184
Pecten extenuatus, n. s., M. & H., 1860 184

17.

MEEK, F. B. Descriptions of new fossil remains collected in Nebraska and Utah by the exploring expeditions under the command of Capt. J. H. Simpson, of the U. S. topographical engineers (extracted from that officer's forthcoming report). <Proc. Acad. Nat. Sci. Phila., vol. xii, pp. 308–315. 1860. Philadelphia, 1861.

Devonian, Carboniferous, Jurassic, Cretaceous, and Tertiary. Republished with illustrations in a quarto volume of Captain Simpson's Reports, in 1876.

DEVONIAN SPECIES.

Page.
Brachiopoda 308
Spirifera norwoodi, n. s., Meek, 1860 308
Spirifera engelmanni, n. s., F. B. Meek, 1860 308-309
Spirifera macra, n. s., F. B. Meek, 1860 309

CARBONIFEROUS SPECIES.

Brachiopoda 309
Productus semistriatus, n. s., F. B. Meek, 1860 309
Productus multistriatus, n. s., F. B. Meek, 1860 309-310
Spirifera scobina, n. s., F. B. Meek, 1860 310
Spirifera pulchra, n. s., F. B. Meek, 1860 310
Conchifera 310
Pecten utahensis, n. s., F. B. Meek, 1860 310
Cephalopoda .....
Orthoceras baculum, n. s., F. B. Meek, 1860 310-311

JURASSIC SPECIES.

Conchifera 311
Ostrea engelmanni, n. s., F. B. Meek, 1860 311
Pecten bellistriata, n. s., F. B. Meek, 1860 311
Gasteropoda 311
Dentalium? subquadratum, n. s., F. B. Meek, 1860 311

CRETACEOUS SPECIES.

Conchifera 311
Anomia concentrica, n. s., F. B. Meek, 1860 311-312
Inoceramus simpsoni, n. s., F. B. Meek, 1860 312

TERTIARY SPECIES.

Conchifera 312
Unio vetusta, n. s., Meek, 1860 312
Unio haydeni, n. s., Meek, 1860 312
Corbula (Potamomya?) pyriformis, n. s., Meek, 1860 312-313
Corbula (Potamomya?) concentrica, n. s., Meek, 1860 313
Corbula (Potamomya?) engelmanni, n. s., Meek, 1860 313
Gasteropoda 313
Melania humerosa, n. s., Meek, 1860 313
Melania simpsoni, n. s., Meek, 1860 313-314
Melania arcta, n. s., Meek, 1860 314
Melania? nitidula, n. s., Meek, 1860 314
Planorbis spectabilis, n. s., Meek, 1860 314
Planorbis utahensis, n. s., Meek, 1860 314
Limnæa vetusta, n. s., Meek, 1860 314
Limnæa similis, n. s., Meek, 1860 314
Melampus priscus, n. s., Meek, 1860 315

18.

MEEK, F. B., *and* HAYDEN, F. V. Systematic catalogue with synonymy, &c., of Jurassic, Cretaceous, and Tertiary fossils, collected in Nebraska by the exploring expeditions under the command of Lieut. G. K. Warren, of U. S. Topographical Engineers. <Proc. Acad. Nat. Sci. Phila., vol. xii, pp. 417–432. 1860. Philadelphia, 1861.

Of the 276 species and varieties enumerated in the following catalogue, 25 are from Jurassic rocks, 194 from Cretaceous, and the remaining 57 from Tertiary strata.

	Page.
Jurassic species	417–419
Cretaceous species	419–430
Tertiary species	430–432

19.

MEEK, F. B., *and* WORTHEN, A. H. Descriptions of new species of Crinoidea and Echinoidea, from the Carboniferous rocks of Illinois and other western States. <Proc. Acad. Nat. Sci. Phila., vol. xii, pp. 379–397. 1860. Philadelphia, 1861.

Afterward republished in the Illinois Geological Reports, vol. ii.

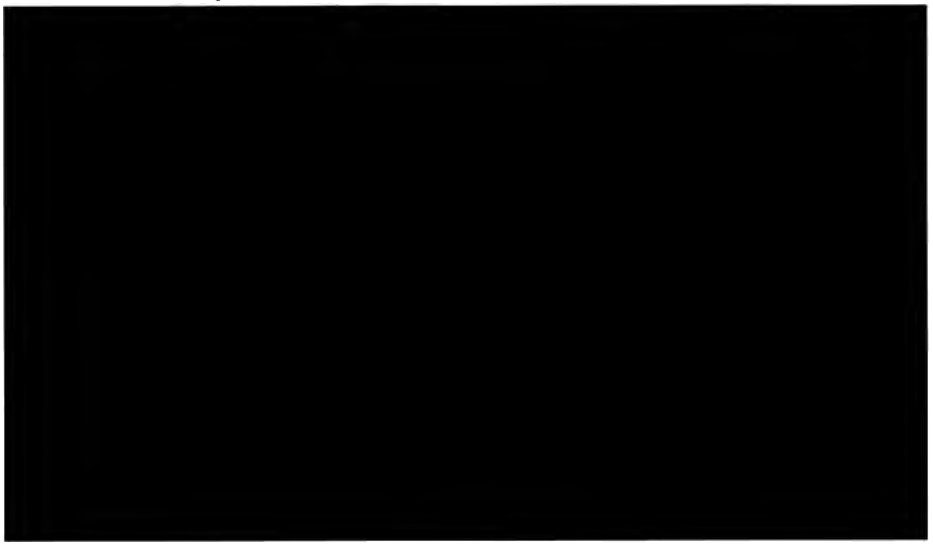
	Page.
Platycrinus, Miller	379
P. prattenanus, n. s., M. & W., 1860	379–380
P. penicillus, n. s., M. & W., 1860	380
P. planus, n. s., M. & W., 1860	380–381
Dichocrinus, Munster	381
D. constrictus, n. s., M. & W., 1860	381
D. conus, n. s., M. & W., 1860	381–382
D. (Pterotocrinus) crassus, n. s., M. & W., 1860	382–383
D. (Pterotocrinus) chesterensis, n. s., M. & W., 1860	383
Trematocrinus, Hall, 1860	383
T. fascellus, n. s., M. & W., 1860	383–384
Actinocrinus, Miller	384
A. validus, n. s., M. & W., 1860	384–385
A. asteriscus, n. s., M. & W., 1860	385–386
A. speciosus, n. s., M. & W., 1860	386
A. scitulus, n. s., M. & W., 1860	386–387
A. araneolus, n. s., M. & W., 1860	387–388
A. (Amphoracrinus) subturbinatus, n. s., M. & W., 1860	388–389
Forbesiocrinus, De Koninck & Le Hon	389
F.? norwoodi, n. s., M. & W., 1860	389
F.? semiovatus, n. s., M. & W., 1860	389–390
Zeacrinus, Troost	390
Z. discus, n. s., M. & W., 1860	390
Z. troostanus, n. s., M. & W., 1860	390–391
Z. planobrachiatus, n. s., M. & W., 1860	391
Cyathocrinus, Miller	391
C. safordi, n. s., M. & W., 1860	391–392
C.? sangamonensis, n. s., M. & W., 1860	392
C.? crassus, n. s., M. & W., 1860	392–393
C. scitulus, n. s., M. & W., 1860	393
C. angulatus, n. s., M. & W., 1860	393–394
Poteriocrinus, Miller	394
P. (Scaphiocrinus) decadactylus, n. s., M. & W., 1860	394
P. swallovi, n. s., M. & W., 1860	394–395
Echinoidea	
Archæocidaris, McCoy	395
A. muronatus, n. s., M. & W., 1860	395–396
Palæchinus, McCoy	396
P. burlingtonensis, n. s., M. & W., 1860	396
Melonites, Owen & Norwood	
M. dunus, n. s., M. & W., 1860	

20.

MEEK, F. B., and WORTHEN, A. H. Descriptions of new Carboniferous fossils, from Illinois and other Western States. <Proc. Acad. Nat. Sci. Phila., vol. xii, pp. 46–72. 1860. Philadelphia, 1861.

Genera Spirorbis, Spirorbis, Salenicus. Afterward republished in the Illinois Geological Reports, vol. i.

	Page.
Zoophyta.	
Spirorbis ? n. g. M. & W., 1860	447–448
S. ammonis, n. s., M. & W., 1860	448
S. compressus, n. s., M. & W., 1860	448
S. carinatus, n. s., M. & W., 1860	448
S. ramosus, n. s., M. & W., 1860	448
Echinodermata	449
Asterida	449
Palæocoma, McCoy	449
Sphagenia Schmidtii	449
Palæocoma Schmidtii, subvittata, n. s., M. & W., 1860	449
Mollusca	450
Brachiopoda	450
Chonetes, Fischer	450
C. pinnatisecta, n. s., M. & W., 1860	450
Productus, Sowerby	450
P. semiplanus, n. s., M. & W., 1860	450
P. parvus, n. s., M. & W., 1860	450–451
P. arctilineatus, n. s., M. & W., 1860	451
Hypothyridæ, Fischer	451
H. subtrigonalis, n. s., M. & W., 1860	451
Athyris, M'Coy	451
A. parvirostris, n. s., M. & W., 1860	451–452
Conchifera	452
Pecten, Linnæus	452
P. interlineatus, n. s., M. & W., 1860	452
Aviculopecten, M'Coy	452
A. occidentalis, n. s., M. & W., 1860	452–453
A. nodosus, n. s., M. & W., 1860	452
A. burlingtonensis, n. s., M. & W., 1860	453
A. arcuatus, n. s., M. & W., 1860	453–454
A. subcarinatus, n. s., M. & W., 1860	454
A. angulatus, n. s., M. & W., 1860	454–455



	Page.
P. pratteni, n. s., M. & W., 1860	459–460
P. subsinuata, n. s., M. & W., 1860	460
P. chesterensis, n. s., M. & W., 1860	460
P. subscalaris, n. s., M. & W., 1860	460–461
P. speciosa, n. s., M. & W., 1860	461
P. turbiniformis, n. s., M. & W., 1860	461
P. scitula, n. s., M. & W., 1860	461–462
P. shumardi, n. s., M. & W., 1860	462
Straparollus, Montfort? = *Euomphalus*, Sowerby	462
Euomphalus planodorsatus, n. s., M. & W., 1860	462
E. umbilicatus, n. s., M. & W., 1860	462–463
Naticopsis, McCoy	463
N. nodosus, n. s., M. & W., 1860	463
N. hollidayi, n. s., M. & W., 1860	463
Platyostoma, Conrad	463
P. nana, n. s., M. & W., 1860	463
P.? tumida, n. s., M. & W., 1860	463–464
Eunema, Salter	464
E.? salteri, n. s., M. & W., 1860	464
Lozonema, Phillips	464
L. scitula, n. s., M. & W., 1860	464–465
L. rugosa, n. s., M. & W., 1860	465
L. cerithiformis, n. s., M. & W., 1860	465
L. inornata, n. s., M. & W., 1860	465
L. nitidula, n. s., M. & W., 1860	465–466
Eulima, Risso	466
E.? peracuta, n. s., M. & W., 1860	466
Macrocheilus, Phillips	466
M. medialis, n. s., M. & W., 1860	466–467
M. intercalaris, n. s., M. & W., 1860	467
M. pulchellus, n. s., M. & W., 1860	467
Soleniscus, n. g., M. & W., 1860	467
S. typicus, n. s., M. & W., 1860	467–468
Cephalopoda	468
Orthoceras, Breynius	468
O. expansum, n. s., M. & W., 1860	468
Cyrtoceras, Goldfuss	468
C. curtum, n. s., M. & W., 1860	468
C.? dilatatum, n. s., M. & W., 1860	468–469
Nautilus, Breynius	469
N. subglobosus, n. s., M. & W., 1860	469
N. chesterensis, n. s., M. & W., 1860	469
N. spectabilis, n. s., M. & W., 1860	469
N. (Discus) planorbiformis, n. s., M. & W., 1860	469–470
N. (Discus) trisulcatus, n. s., M. & W., 1860	470
N. (Discus) digonus, n. s., M. & W., 1860	470
N. (Discus) sangamonensis, n. s., M. & W., 1860	470–471
Goniatites, De Haan	471
G. globulosus, n. s., M. & W., 1860	471
G. iowensis, n. s., M. & W., 1860	471
G. lyoni, n. s., M. & W., 1860	471–472
Subgenus *Oligoporus*,* n. s. g., M. & W., 1860	472

21.

MEEK, F. B., *and* WORTHEN, A. H. Remarks on the age of the Goniatite limestone at Rockford, Indiana, and its relation to the "Black Slate" of the western States, and to some of the succeeding rocks above the latter. <Am. Journ. Sci., vol. xxxii, 2d ser., pp. 167–177. 1861. New Haven, 1861.

The authors conclude it to be probably of Carboniferous age, and, at any rate, much more recent than the Chemung, and not equivalent to any New York rock.

*ὀλίγος, few; and πόρος, opening a pore.

22.

MEEK, F. B., *and* WORTHEN, A. H. Descriptions of new Paleozoic fossils from Illinois and Iowa. <Proc. Acad. Nat. Sci. Phila., vol. xiii, pp. 128–148. 1861. Philadelphia. 1862.

Genera Bursacrinus, Cardiopsis, Orthonema. Afterward republished in the Illinois Geological Reports, vol. ii.

	Page.
Echinodermata:	
Crinoidea:	
Platycrinus, Miller, 1821.	
P. oweni, n. s., M. & W., 1861	128-129
P. scobina, n. s., M. & W., 1861	129
P. (Pleurocrinus) asper, n. s., M. & W., 1861	129-130
Forbesiocrinus, Koninck & Le Hon	130
F. monroensis, n. s., M. & W., 1861	130-131
F. agassizi var. *giganteus*, n. s., M. & W., 1861	131
Actinocrinus, Miller, 1821	131
A. dodecadactylus, n. s., M. & W., 1861	131
A. pyriformis var. *rudis*, M. & W., 1861	131-132
A. (Amphoracrinus ?) concavus, n. s., M. & W., 1861	132-133
A. (Pradocrinus ?) amplus, n. s., M. & W., 1861	133-134
A. sillimani, n. s., M. & W., 1861	134-135
Agariocrinus, Troost	135
A. gracilis, n. s., M. & W., 1861	135
Platycrinus multi-branchiatus, n. s., M. & W., 1861	135-136
Cyathocrinus, Miller, 1821	136
C. wachsmuthi, n. s., M. & W., 1861	136
Bursacrinus, n. g., M. & W., 1861	136
B. wachsmuthi, n. s., M. & W., 1861	137
Poteriocrinus, Miller, 1821	137
P. ? enormis, n. s., M. & W., 1861	137-138
P. sub-impressus, n. s., M. & W., 1861	138
P. tenuibrachiatus, n. s., M. & W., 1861	138-139
P. carinatus, n. s., M. & W., 1861	139-140
Subgenus *Scaphiocrinus*, Hall, 1858	140
P. (Scaphiocrinus ?) carbonarius, n. s., M. & W., 1861	140
P. (Scaphiocrinus) solidus, n. s., M. & W., 1861	140-141
P. (Scaphiocrinus) wachsmuthi, n. s., M. & W., 1861	141
Blastoidea:	
Pentremites, Say, 1820	141
P. cornutus, n. s., M. & W., 1861	141-142
P. melo var. *projectus*, n. s., M. & W., 1861	142
Astereidea:	
Petraster, Billings, 1858	142
P. wilberanus, n. s., M. & W., 1861	142
Molluscæ	
Brachiopoda:	
Productus, Sowerby, 1812	142
P. magnus, n. s., M. & W., 1861	142-143
Spirifera glabra var. *contracta*, n. s., M. & W., 1861	143-144
Lamellibranchiata:	
* *Cardiopsis*, n. g., M. & W., 1861	144
Leda, Schumacher, 1817	144
L. curta, n. s., M. & W., 1861	144-145
Gasteropoda.	
Dentalium, Lin., 1740	145
D. venustum, n. s., M. & W., 1861	145
Straparollus, Montfort, 1810	145
S. similis, n. s., M. & W., 1861	145-146
S. similis var. *planus*, M. & W., 1861	146

* Cardium and ὄψις, from its resemblance to Cardium.

	Page.
† *Orthonema*, n. g., M. & W., 1861	146
Loxonema, Phillips, 1841	146
L. multicostata, n. s., M. & W., 1861	146–147
Cephalopoda:	
Orthoceras, Breynius, 1732	147
O. annulocostatum, n. s., M. & W., 1861	147
Nautilus, Breynius, 1732	147
‡ Subgenus *Trematodiscus*, n. s. g., M. & W., 1861	147

Corrections in regard to a few fossils described in papers of September and October, 1860.

Cyathocrinus scitulus (September, 1860) should be *C. sculptilus.*

Platyostoma nana (October, 1860) should be *Naticopsis.*

Eulima peracuta (October, 1860) should be ranged under *Polyphemopsis*, of Portlock, probably a section of the genus *Loxonema.*

Orthoceras expansum (October, 1860) belongs to the genus or subgenus *Actinoceras.*

Cyrtoceras curtum (October, 1860) should be ranged under the subgenus *Aplocerас.*

23.

MEEK, F. B. Descriptions of new Cretaceous fossils collected by the Northwestern Boundary Commission on Vancouver and Sucia Islands. <Proc. Acad. Nat. Sci. Phila., vol. xiii, pp. 314–318. 1861. Philadelphia, 1862.

Lamellibranchiata:	Page.
Inoceramus subundatus, Meek, n. s., 1861	315
Dosinia ? tenuis, n. s., Meek, 1861	315
Mactra gibbsana, n. s., Meek, 1861	315–316
Cephalopoda:	
Baculites inornatus, n. s., Meek, 1861	316
Baculites occidentalis, n. s., Meek, 1861	316–317
Ammonites complexus var. *suciaensis*, n. s., Meek, 1861	317
Ammonites vancouverensis, n. s., Meek, 1861	317–318
Nautilus campbelli, n. s., Meek, 1861	318

24.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new Lower Silurian (Primordial), Jurassic, Cretaceous, and Tertiary fossils, collected in Nebraska by the exploring expedition under the command of Capt. Wm. F. Raynolds, U. S. Top. Engrs., with some remarks on the rocks from which they were obtained. <Proc. Acad. Nat. Sci. Phila., vol. xiii, pp. 415–447. 1861. Philadelphia, 1862.

	Page.
Lower Silurian (Primordial) rocks	415–416
Jurassic rocks	416–417
Cretaceous rocks	417–432
Lower series	417–424
General section of the Cretaceous rocks of Nebraska	419
Upper Cretaceous series of Nebraska	424–432
New Jersey section, compiled from the reports of that State	426
Fox Hill beds	427
Relations of the upper Cretaceous series of Nebraska to European divisions	428–432
Tertiary rocks	432–435
General section of the Tertiary rocks of Nebraska	433
SILURIAN (PRIMORDIAL) FOSSILS.	
Brachiopoda:	
Obolella, Billings	435
O. nana, n. s., M. & H., 1861	435–436

† ὀρθος, straight; νημα, thread.

‡ τρῆμα and δισκος, in allusion to the perforated umbilicus and the discoid a- typical species.

P

Pteropoda? .....
Theca, Morris .....
Theca (Pugiunculus) gregarea, n. s., M. & H., 1861 .....
Trilobites .....
Arionellus, Barrande .....
A. (Crepicephalus) ovoni, n. s., M. & H., 1861 43

JURASSIC FOSSILS.

Lamellibranchiata .....
Gryphaea, Lamarck .....
G. salcosa var. *nebrascensis*, M. & H., 1861 43
Modiola, Lamarck .....
M. (Perna) formosa, n. s., M. & H., 1861 .....

CRETACEOUS FOSSILS.

Lamellibranchiata .....
Ostrea, Linnaeus .....
O. gabbana, n. s., M. & H., 1861 .....
Leda, Schumacher .....
L. bisulcata, n. s., M. & H., 1861 .....
Gervillia, Defrance .....
G. recta, n. s., M. & H., 1861 .....
Crenella, Brown .....
C. elegantula, n. s., M. & H., 1861 44
Cardium, Linnaeus .....
C. (Hemicardium?) curtum, n. s., M. & H., 1861 .....
C. pertenue, n. s., M. H., 1861 .....
Callista, Poli .....
C. deweyi, M. & H., 1856 .....
Tellina, Linnaeus .....
T. nitidula, n. s., M. & H., 1861 .....
Lingula, Bruguiere .....
L. nitida, n. s., M. & H., 1861 44
Gasteropoda .....
Neritella, Humphrey .....
N. nebrascensis, n. s., M. & H., 1861 .....
Melania, Lamarck .....
M. (Potodoma) veterna, n. s., M. & H., 1861 44
Cephalopoda .....
Baculites, Lamarck .....
B. baculus, n. s., M. & H., 1861 .....

TERTIARY FOSSILS.

Gasteropoda .....
Vivipara, Lamarck .....
V. raynoldsana, n. s., M. & H., 1861 .....
Helix, Linnaeus .....
H. spatiosa, n. s., M. & H., 1861 44
H. veterna, n. s., M. & H., 1861 .....
Correction, notes the omission of the name Arcadæ on p. 428 of the Proc. for 1860 ...

25.

MEEK, F. B., *and* HAYDEN, F. V. Descriptions of new Cretaceous fossils from
braska Territory, collected by the expedition sent out by the Government ur
the command of Lieut. John Mullan, U. S. Topographical Engineers, for the l
tion of a wagon road from the sources of the Missouri to the Pacific Oc
<Proc. Acad. Nat. Sci. Phila., vol. xiv, pp. 21–28. 1862. Philadelphia, 1863

Cephalopoda:

P

Scaphites, Parkinson .....
S. ventricosus, n. s., M. & H., 1862 .....
S. vermiformis, n. s., M. & H., 1862 2
Ammonites, Bruguière .....

Page.
A. mullanensis, n. s., M. & H., 1862 ... 23–25
Nautilus, Breynius ... 25
N. elegans, Sowerby var. *nebrascensis*, M. & H., 1862 ... 25

Lamellibranchiata:

Inoceramus, Sowerby ... 26
I. undabundus, n. s., M. & H., 1862 ... 26
I. exogyroides, n.s., M. & H., 1862 ... 26–27
I. tenuirostratus, n. s., M. & H., 1862 ... 27
Venilia, Morton ... 27
V. mortoni, n. s., M. & H., 1862 ... 27–28
Pholadomya, Sowerby ... 28
P. papyracea, n. s., M. & H., 1862 ... 28

26.

MEEK, F. B. Remarks on the family Actæonidæ, with descriptions of some new genera and subgenera. <Am. Journ. Sci., vol. xxxv, 2d ser., pp. 84–94. 1863. New Haven, 1863.

Page.
Actæoninæ:
Actæonella, d'Orbigny (as restricted) ... 89
Trochactæon, Meek, 1863 (Actæonella (part) d'Orb.) ... 89–90
Subgenus, *Spiractæon* Meek, 1863 ... 90
Cylindrites (Auct.) Morris & Lycett (as restricted) ... 90–91
Subgenus *Gonicocylindrites* ... 91
Actæonina, d'Orbigny (as restricted) ... 91
Subgenus, *Trochactæonina* Meek, 1863 ... 91
Euconactæon, Meek, 1863 (Acteonina (part) d'Orb. & Alt.) ... 91–92
Subgenus ? *Conactæon*, Meek ... 92
Bingiculinæ:
Oinulia, Gray ... 92
Subgenus *Avellana*, d'Orbigny ... 92
Subgenus *Euptycha*, Meek, 1863 ... 93
Aptycha, Meek, 1863 ... 93–94

27.

MEEK, F. B. Remarks on the family Pterriidæ (= Aviculidæ), with descriptions of some new fossil genera. <Am. Journ. Sci., vol. xxxvii, 2d ser., pp. 212–220. 1864. New Haven, 1864.

Page.
Pterriidæ (or Aviculidæ) ... 214–215
Pterinidinæ (or Pterinia group) ... 215
Pterinæ (or Aviculinæ) ... 215
Melininæ (Perna or Isognomen group) ... 215
Gryphorhynchus, n. g., Meek, 1864 ... 217–218
Bumicrotis, n. g., Meek, 1864 ... 218–220

28.

MEEK, F. B. Carboniferous and Jurassic fossils. <Paleontology of California (Whitney), vol. i, pp. 1–16, 2 plates, and pp. 39–53, pls. vii and viii. 1864. Published by authority of the legislature of California, 1844.

DESCRIPTION OF CARBONIFEROUS FOSSILS.

Foraminifera:
Fusulina, Fischer ...
F. robusta, n. s., Meek, 1864, pl. ii, figs. 3 and 3 *a–c* ...
F. gracilis, n. s., Meek, 1864, pl. ii, fig. 1 and 1 *a–c* ...
F. cylindrica, Fischer ?, 1837, pl. ii, figs. 2 and 2 *a* ...

Pa

Zoophyta.
Lithostrotion, Fleming
L. mamillare (?), Castlenau (sp.), 1843, pl. i, figs. 4 and 4 *a*, *b*
L.? californiense, n. s., Meek, 1864, pl. i, figs. 2 and 2 *a–c*
Lithostrotion ——*?*, Meek, 1864, pl. i, figs. 3 and 3 *a*
Oliciophyllum, Dana
O. gabbi, n. s., Meek, 1864, pl. i, fig. 1 and 1 *a*, *b*

Mollusca.
Brachiopoda
Orthis, Dalman
Orthis, sp. undt., 1864, pl. ii, figs. 5 and 5 *a–c* 1
Productus, Sowerby
P. semireticulatus, Martin (sp.), 1809, pl. ii, figs. 4 and 4 *a*
Rhynchonella, Fischer
Rhynchonella, sp. undt., 1864
Spirifer, Sowerby
Subgenus *Martinia*, McCoy
S. (Martinia) lineatus, Martin? (sp.), 1809, pl. ii, figs. 6 and 6 *a–d*
Spiriferina, Davidson
Spiriferina, sp. undt., 1864
Retzia, King
R. compressa, n. s., Meek, 1864, pl. ii, figs. 7 and 7 *a–c*
Gasteropoda
Euomphalus, Sowerby = *Straparollus*, Montfort?
Subgenus *Omphalotrochus*, Meek
E. (Omphalotrochus) whitneyi, n. s., Meek, 1864, pl. ii, figs. 8 and 8 *a* 1

DESCRIPTION OF THE JURASSIC FOSSILS.

Brachiopoda
Rhynchonellidæ
Rhynchonella, Fischer, 1809
R. gnathophora, n. s., Meek, 1864, pl. viii, fig. 1 and 1 *a–f* 1
Terebratulidæ
Terebratula, Müller, 1776
Terebratula ——, 1864, pl. viii, figs. 2 and 2 *a*, *b*
Lamellibranchiata
Ostreidæ
Gryphæa, Lamarck, 1801
Gryphæa ——, 1864, pl. viii, figs. 4 and 4 *a*
Limidæ
Lima, Bruguière, 1792
L.? sinuata, n. s., Meek, 1864, pl. vii, figs. 4 and 4 *a*
L. reticostata, n. s., Meek, 1864, pl. vii, fig. 5
L.? cuneata, n. s., Meek, 1864, pl. vii, figs. 6 and 6 *a* 4
Pectenidæ
Pecten, Müller, 1776 2
P. acutiplicatus, n. s., Meek, 1864, pl. viii, fig. 3
Pteriidæ
Inoceramus, Sowerby, 1814
I.? obliquus, n. s., Meek, 1864, pl. vii, figs. 2 and 2 *a*
I.? rectangulus, n. s., Meek, 1864, pl. vii, figs. 1 and 1 *a* 4
Trigoniidæ
Trigonia, Bruguière, 1789
T. pandicosta, n. s., Meek, 1864, pl. viii, fig. 7 4
Mytilidæ
Mytilus, Linnæus, 1758
M. multistriatus, n. s., Meek, 1864, pl. vii, figs. 7 and 7 *a*
Crassatellidæ
Astarte, Sowerby, 1816
A. ventricosa, n. s., Meek, 1864, pl. viii, figs. 5 and 5 *a*
Lucinidæ
Unicardium, d'Orbigny, 1852
U.? gibbosum, n. s., Meek, 1864, pl. viii, figs. 8 and 8 *a* 5
Anatinidæ

	Page.
Mysoites (Schlot.), Munster, 1840	51
M. depressus, n. s., Meek, 1864, pl. viii, figs. 6 and 6 *a*	51–52
Cephalopoda	53
Belemnitidæ	53
Belemnites, Auct.	53
Belemnites, ——, 1864, pl. viii, figs. 9 and 9 *a*	53

29.

MEEK, F. B., *and* HAYDEN, F. V. Paleontology of the Upper Missouri. <Smithsonian contributions to knowledge (172), pp. 1–135, pls. i–v. 1864. Washington, 1865.

Primordial, Carboniferous, Permian, and Jurassic. Genera Camptonectes, Lioplacodes, Eumicrotis, Chœnomya. This work contains descriptions of new fresh-water Jurassic species, the first of that age discovered in North America. The work has additional importance in consequence of the philosophical discussion of important questions.

	Page.
Introduction	VII–IX
SILURIAN AGE. (POTSDAM OR PRIMORDIAL PERIOD.)	
Mollusca.	
Brachiopoda.	
Lingulidæ	1
Lingulepis, Hall, 1863	1–2
L. pinniformis, Owen, 1852, pl. i, figs. 1 *a*, *b*	2–3
L. prima (Conrad), Hall, 1847, pl. i, figs. 2 *a*, *b*	3
Obolella, Billings, 1861	3–4
O. nana, M. & H., 1861, pl. i, figs. 3 *a–d*	4
Gasteropoda.	
Pteropoda.	
Thecosomata	
Cavolinidæ	4–5
Theca, Sowerby, 1845	5
T. gregaria, M. & H., 1861, figs. *a–d*, p. 5	5–6
Articulata.	
Crustacea.	
Trilobita.	
Paradoxidæ	7
Agraulos, Corda, 1847	7–9
A. ceveni, M. & H., 1861, figs. *a–c*, p. 9	9–10
Agraulos ——? pl. i, fig. 4	10
CARBONIFEROUS AGE. (CARBONIFEROUS PERIOD.)	
Protozoa.	
Rhizopoda.	
Foraminifera.	
Cornuspiridæ	11–13
Fusulina, Fischer, 1837	13–14
F. cylindrica, Fischer, 1837, pl. i, figs. 6 *a–i*	14–15
Mollusca.	
Brachiopoda.	
Spiriferidæ	16
Spirifer, Sowerby, 1815	17–20
Trigonotreta, Kœnig, = *Spirifer* of most authors	19
Martinia, McCoy, = *Ambocœlia*, Hall	19
S. (*Martinia*) *plano-convexus* Shumard, 1855, figs. *a–e*, p. 21	20–21
Productidæ	21–22
Chonetes, Fischer, 1837	22
C. mucronata, M. & H., 1858, pl. i, fig. 5, *a–e*	22–23
Strophomenidæ	23
Hemipronites, Pander, 1830	24–26
H. crassus, M. & H., 1858, pl. i, fig. 7 *a–d*	26–27

	Page.
Lamellibranchiata.	
Pteriidæ (=*Aviculidæ*)	27–30
Pteriniinæ (or Pterinia group)	28
Pteriinæ (or *Aviculinæ*)	28
Melininæ (Perna or Isognomon group)	28
Pterinitinæ	30
Myalina, Koninck, 1842	30–32
Shell structure of *Myalina angulata*, fig. —	31
M. perattenuata, M. & H., 1858, pl. i, figs. 12 *a*, *b*	32
M. subquadrata, Shumard, figs. *a*, *b*, p. 33	33–34
Orassatellidæ	34
Pleurophorus, King, 1844	34–35
Subgenus *Oleidophorus*, Hall, 1847	35
P. occidentalis, M. & H., pl. i, figs. 11 *a*, *b*	35
Anatinidæ	36
Allorisma, King, 1844	36–37
A. subcuneata, M. & H., 1858, pl. i, figs. 10 *a*, *b*	37–38
Sedgwickia, McCoy, 1844	38–40
S. topekaensis ?, Shumard, 1858, figs. *a*, *b*, p. 40	40–41
S.? *concava*, M. & H., 1858, pl. i, figs. 8 *a*, *b*	41
S.? *altirostrata*, M. & H., 1858, pl. i, fig. 9	41–42
**Chænomya*, n. g., Meek, 1865	42–43
C. leavenworthensis, M. & H., 1858, pl. ii, figs. 1 *a–c*	43–44
C. cooperi, M. & H., 1858, pl. ii, figs. 2 *a*, *b*	44
Gasteropoda.	
Prosobranchiata.	
Rhipidoglossata.	
Podophthalma.	
Pleurotomariidæ	44–45
Pleurotomaria, Defrance, 1826	45–46
P. humerosa, M. & H., 1858, pl. i, figs. 14 *a*, *b*	46–47
P. subturbinata, M. & H., 1858, pl. i, fig. 13	47
CARBONIFEROUS AGE. (PERMIAN PERIOD.)	
Mollusca.	
Lamellibranchiata.	
Pectinidæ	48–[illegible]
Pectininæ	48–[illegible]
Aviculo-pectininæ	48–[illegible]
Aviculopectininæ	48–[illegible]
Aviculopecten, McCoy, 1851	48–[illegible]
A. amplus, M. & W., fig. —, p. 50	50
Aviculopecten, ——?, pl. ii, fig. 10	50
A. macoyi, pl. ii, fig. 9	50–51
Pteriidæ.	
Pteriniinæ	51
Myalina, Koninck, 1842	51
M. aviculoides, M. & H., 1860, pl. ii, figs. 8 *a–d*	51–52
M. permiana, Swallow, 1858, pl. ii, figs. 7 *a–c*	52
Pteriinæ.	
Eumicrotis, Meek, 1864	53–54
E. hawni, M. & H., pl. ii, figs. 5 *a–c*, and fig. 1, p. 54	54–55
Shell structure of *E. curta*, No. 2, p. —	54
E. hawni var. *ovata*, pl. ii, figs. 5 *a*, *b*	55
Melininæ.	
Bakevellia, King, 1848	57
B. parva, M. & H., 1858, pl. ii, figs. 12 *a*, *b*	57
Trigoniidæ	57–58
Schizodus, King, 1846	58–59
S. ovatus, M. & H., 1858, pl. ii, figs. 11 *a*, *b*	59
Nuculanidæ	59–60
Nuculaninæ	60
Malletinæ	60

*Χαίνω, to open or gape; and *mya*.

	Page.
Nuculaninæ	60
Yoldia, Möller, 1842	60
Y.? subcitula, M. & H., 1858, pl. ii, figs. 4 *a*, *b*	60–61
Crassatellidæ	61
Pleurophorus, King, 1844	61
P.? subcuneatus, M. & H., 1858, pl. ii, fig. 3	61
P.? calhouni, M. & H., 1858, pl. ii, figs. 13 *a*, *b*	62
Cephalopoda.	
Tetrabranchiata.	
Nautilidæ	62–64
Nautilus, Linnæus, 1758	64–65
N. excentricus, M. & H., pl. ii, figs. 14 *a*, *b*	65

REPTILIAN AGE. (JURASSIC PERIOD.)

Radiata.	
Echinodermata.	
Crinoidea.	
Pentacrinidæ.	
Pentacrinites, Miller, 1821	66
Chladocrinus or *Cladocrinus* [Agassiz]	66
Pentacrinus asterisous, M. & H., 1858, pl. iii, figs. 2 *a*, *b* and fig. —, p. 67	67
Mollusca.	
Brachiopoda.	
Lingulidæ	68
Lingula, Bruguière, 1792	68–69
L. brevirostris, M. & H., 1858, pl. iii, figs. 3 *a*, *b*	69
Rhynchonellidæ	70
Rhynchonella, Fischer, 1809	70–71
Rhynchonella, ——, pl. iii, fig. 4	71–72
Lamellibranchiata.	
Ostreidæ	72
Ostrea, Linnæus, 1758	72–73
O. engelmanni, Meek, 1860, figs. A, B, p. 73	73–74
Gryphæa, Lamarck, 1801	74
G. calceola var. *nebrascensis*, M. & H., 1861, pl. iii, figs. 1 *a–e* and figs. A–E, p. 75	74–76
Pectinidæ	76
Pectininæ	76
Camptonectes, Agassiz, 1865	76–77
C. bellistriatus, Meek, 1860, figs. A–D, p. 77	77–78
C.? extenuatus, M. & H., 1860, pl. iii, fig. 6	78
Pteriidæ	79
Pteriinæ	79
Pteria, Scopoli, 1777	79
Subgenus *Oxytoma*, n. s. g., Meek, 1865	79–80
Pteria (*Oxytoma*) *munsteri*, Bronn, 1829, figs. A, B, p. 80	80–81
Eumicrotis, Meek, 1864	81
E. curta, Hall, 1852, pl. iii, figs. 10 *a–d*	81
Trigoniidæ	82
Trigonia, Bruguière, 1789	82–83
Subdivisions:	
Les Scaphoides, Agassiz. (Jurassic and Cretaceous.)	
Les Clavelles, Agassiz. (Mainly Jurassic.)	
Les Carres, Agassiz. (Upper Jurassic and Cretaceous.)	
Les Scabres, Agassiz. (Mainly Cretaceous.)	
Les Undulées, Agassiz. (Jurassic and Cretaceous.)	
Les Costées, Agassiz. (Jurassic and Cretaceous.)	
Les Lissées, Agassiz. (Jurassic and Cretaceous.)	
Les Pectinacées, Agassiz. (Existing seas.)	
Trigonia conradi, M. & H., 1860, pl. iii, fig. 11	83–84
Mytilidæ	84
Volsella, Scopoli, 1777	85–86
V. pertenuis, M. & H., 1858, pl. iii, figs. 5, 5 *a*	86
V. formosa, M. & H., 1861, figs. A, B, p. 87	86–87
Arcidæ	87–89
Arcinæ	88

Page.

Macrodontinæ 88
Axininæ 88
Macrodontinæ 89
Grammatodon, M. & H., 1858 89
G. inornatus, M. & H., 1858, pl. iii, figs. 9, 9 *a*, 9 *b* 90
Unionidæ 90-91
Unio, Retzius, 1788 92
U. nucalis, M. & H., 1858, pl. iii, figs. 13 *a–c* 92-93
Crassatellidæ 93
Astarte, Sowerby, 1816 93-94
A. fragilis, M. & H., 1860, pl. iv, fig. 7 94
A. inornata, M. & H., 1860, pl. iii, figs. 12 *a*, *b* 94
Tancrediidæ 95
Tancredia, Lycett, 1850 95-96
T. warrenana, M. & H., 1860, pl. iii, fig. 7 96
T.? æquilateralis, M. & H., 1860, pl. iii, fig. 8 96-97
Cardiidæ 97
Protocardia, Beyrich, 1845 97-98
P. shumardi, M. & H., 1860, figs. A, B on p. 98 98-99
Anatinidæ 99
Myacites (Schlot.), Munster, 1840 99-100
M. nebrascensis, M. & H., 1860, pl. iv, fig. 5 100-101
M. subellipticus, M. & H., 1858, pl. iv, figs. 6 *a–c* 101
Thracia, Leach, 1819 101-102
T.? sublævis, M. & H., 1860, pl. iv, figs. 4, 4 *a* 102
T.? arcuata, M. & H., 1860, pl. iv, fig. 8 102
Pholadomya, Sowerby, 1823 102-103

Section I.—Species without a circumscribed cardinal area.

Multicostatæ, Agassiz. (Jurassic and Cretaceous.)
Trigonatæ, Agassiz. (Cretaceous, Tertiary, and Recent.)
Bucardinæ, Agassiz. (Lias to Tertiary.)

Section II.—Species with a circumscribed cardinal area.

Flabellatæ, Agassiz. (Jurassic.)
Ovales, Agassiz. (Jurassic.)
Cardissoides, Agassiz. (Jurassic.)
Pholadomya humilis, M. & H., 1860, pl. iv, figs. 3, *a*, *b* 104

Gasteropoda.
Pulmonifera.
Inoperculata.
Limnophila.
Limnæidæ 105-106
Limnæinæ 105
Physinæ 105
Planorbinæ 105
Planorbis, Müller, 1774 106
Planorbella, Haldeman 106
Helisoma, Swainson 107
Taphius, H. & A. Adams 107
Menetus, H. & A. Adams 107
Anisus, Fitzinger 107
Bathyomphalus, Agassiz (=*Spirorbis*, Swainson, not Lamk.) 107
Gyraulus, Agassiz (=*Nautilina*, Stein) 107
Planorbis veternus, M. & H., 1860, pl. iv, figs. 1 & 1 *a*, *b* 107
Prosobranchiata.
Riphidoglossata.
Podopthalma.
Neritidæ 108
Neritella, Humphrey, 1797 108-109
N. nebrascensis, M. & H., 1861, figs. —, on p. 109 109-110
Cyclobranchiata.
Dentaliidæ 110
Dentalium, Lin., 1740 111
D. subquadratum, Meek, 1860, fig. —, p. 111 111
chiata (=*Pectinibranchiata*).

Page.
Eostrifera.
Valvatidæ.
Valvata, Müller, 1774 112
Valvata (proper) = *Gyrorbis*, Fitzinger, = *Planella*, Schlut 112
Tropidina, H. & A. Adams 112-113
Subgenus *Tropidina*, H. & A. Adams 113
Valvata? (Tropidina) scabrida, M. & H., 1860, pl. iv, figs. 2 *a*, *b* 113
Viviparidæ 113-114
Viviparus, Montfort, 1810 114-115
V. gilli, pl. v, figs. 3 *a*, *b* 115
Lioplacodes, Meek, 1864 115-116
L. vetternus, M. & H., 1861, figs. —, p. 116 116
Cephalopoda.
Tetrabranchiata.
Ammonitidæ 116-118
Trigonellites, Parkinson, 1811, fig. 1, p. 119, figs. 2-4, p. 120 118-120
Ammonites, Brugnière, 1789 121-122
A. cordiformis, M. & H., 1858, pl. v, figs. 2 *a-c* 122-123
A. henryi, M. & H., 1858, pl. iv, figs. 9 *a-c* 123-124
Dibranchiata.
Decapoda.
Belemnitidæ 124
Belemnites, Auct 124-125
Acoeli, Bronn 125
Gastrocoeli, D'Orbingy = *Notosiphites*, Duval 125
Notocoeli, D'Orbigny = *Gastrosiphites*, Duval 125
Belemnites densus, M. & H., 1858, pl. iv, figs. 10 *a-c*, and pl. v, figs. 1, 1 *a-h* 126-127
Articulata.
Annulata.
Tubicola.
Serpulidæ 137
Serpula, Linnæus, 1758 127-128
Serpula, undt. pl. v, fig. 4 128

30.

MEEK, F. B. Description of fossils from the auriferous slates of California. <Geol. surv. California, Geology, vol. i. (Appendix B), pp. 477–482, 1 plate, 1865. Published by authority of the legislature of California, 1865. Philadelphia, 1865.

Jurassic fossils.—This article is in the volume of Geology, and not in either of those devoted to Paleontology exclusively.

Page.
Amussium (Klein), Bolton, 1798 478
Subgenus *Entolium*, Meek 478
A. aurarium, n. s., Meek, 1865, pl. i, figs. 6 and 6 *a* 478-479
Aucella, Keyserling, 1843 479
A. erringtoni, Gabb, sp., 1864, pl. i, figs. 2, 3, 7, 5, *a-d* 479-480
A. erringtoni, var. *linguiformis*, Meek, 1865, pl. i, figs. 1 and 1 *a* 481
Pholadomya, Sowerby, 1823 481
Pholadomya (?) *orbiculata*, Gabb, pl. i, fig. 4 481
Belemnites, Auct 482
Belemnites pacificus, Gabb 482

31.

MEEK, F. B. Remarks on the Carboniferous and Cretaceous Rocks of Eastern Kansas and Nebraska, and their relations to those of the adjacent States, and other localities farther eastward, in connection with a review of a paper recently published on this subject by M. Jules Marcou, in the Bulletin of the Geological Society of France. <Am. Journ. Sci., vol. xxxix, 2d ser., pp. 157–174. 1865. New Haven, 1865.

The paper of Professor Marcou's referred to is the "Reconnaissance geologique du Nebraska," par Jules Marcou. Bull. Geol. Soc. France, xxi, pp. 132–147, January, 1864.

At the close of the paper Meek & Worthen describe:

Page.
Eriocrinus, n. g., M. & W., 1865 174
Eriocrinus typus, n. s., M. & W., 1865 174
Eriocrinus nebrascensis, n. s., M. & W., 1865 174

32.

MEEK, F. B., *and* WORTHEN, A. H. Note in relation to a genus of Crinoids from the Coal measures of Illinois and Nebraska, proposed by them on page 174 of this volume of the Journal. <Am. Journ. Sci., vol. xxxix, 2d ser., p. 350. 1865. New Haven, 1865.

The authors regard their genus Erisocrinus as identical with Philocrinus de Koninck.
Erisocrinus typus is changed to *Philocrinus pelvis*, M. & W.
E. nebrascensis to *P. nebrascensis*.

33.

MEEK, F. B. Preliminary notice of a small collection of fossils found by Dr. Hays (Hayes) on the west shore of Kennedy channel, at the highest northern localities ever explored. <Am. Journ. Sci., vol. xl, 2d ser., pp. 31–34. 1865. New Haven, 1865.

Upper Silurian.

	Page.
Zaphrentis haysii, n. s., Meek, 1865	33
Syringopora, sp. undt	33
Favosites, sp. undt	33
Strophomena rhomboidalis, Wahlb	33
Strophodonta headleyana, Hall?	33
Strophodonta beckii, Hall?	33
Rhynchonella, sp. undt	33
Coelospira concava, Hall	33
Spirifer, sp. undt	33
Loxonema? kanei, n. s., 1865, Meek	33
Orthoceras, sp. undt	33
Illænus, sp. undt	33

34.

MEEK, F. B. Note on the genus Gilbertsocrinus Phillips. <Proc. Acad. Nat. Sci. Phila., vol. xvii, pp. 166–167. 1865. Philadelphia, 1865.

The author takes the ground that the difference between Gilbertsocrinus Phillips, Goniasteroidocrinus Lyon & Casseday, and Trematocrinus Hall, is at most not more than subgeneric.

35.

MEEK, F. B. Observations on the microscopic shell structure of Spirifer cuspidatus Sowerby, and some similar American forms. <Proc. Acad. Nat. Sci. Phila., vol xvii, pp. 275–277. 1865. Philadelphia.

36.

MEEK, F. B., *and* WORTHEN, A. H. Notice of some new types of organic remains from the Coal-measures of Illinois. <Proc. Acad. Nat. Sci. Phila., vol. xvii, pp. 41–53. 1865. Philadelphia, 1865.

Genera Acanthotelson, Palæocaris, Anthracerpes, Palæocampa, afterward republished and illustrated in vol. iii of the Illinois Geological Reports.

CRUSTACEA.

Entomostraca.
Xyphosura.

	Page.
Bellinurus, Koenig	43
B. danæ, M. & W., n. s., 1865	44–45
Tetradecapoda.	
Isopoda.	
(Anisopoda.)	
Acanthotelsonidæ.	
Acanthotelson, n. g., M. & W., 1865	46–47
A. stimpsonii, n. s., M. & W., 1865	47–48
A. inæqualis, n. s., M. & W., 1865	48

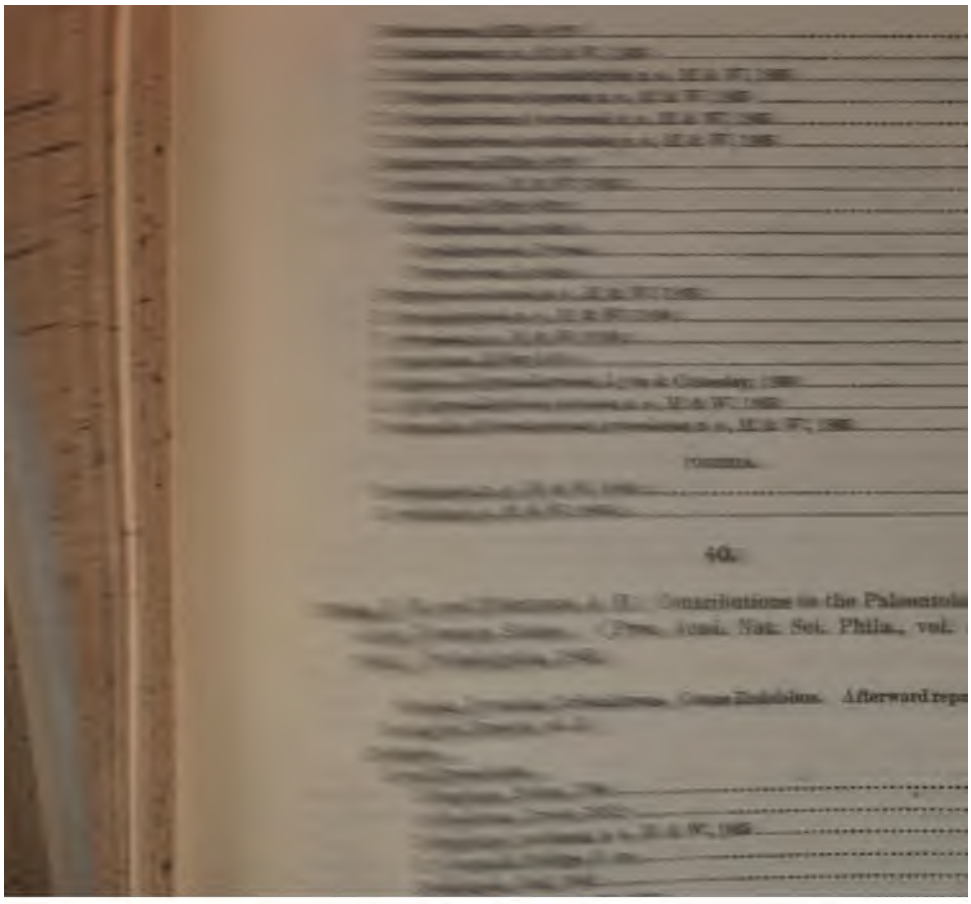
	Page.
P. prattoni, n. s., M. & W., 1860	459–460
P. subsinuata, n. s., M. & W., 1860	460
P. chesterensis, n. s., M. & W., 1860	460
P. subscalaris, n. s., M. & W., 1860	460–461
P. speciosa, n. s., M. & W., 1860	461
P. turbiniformis, n. s., M. & W., 1860	461
P. scitula, n. s., M. & W., 1860	461–462
P. shumardi, n. s., M. & W., 1860	462
Straparollus, Montfort? = *Euomphalus*, Sowerby	462
Euomphalus planodorsatus, n. s., M. & W., 1860	462
E. umbilicatus, n. s., M. & W., 1860	462–463
Naticopsis, McCoy	463
N. nodosus, n. s., M. & W., 1860	463
N. hollidayi, n. s., M. & W., 1860	463
Platyostoma, Conrad	463
P. nana, n. s., M. & W., 1860	463
P.? tumida, n. s., M. & W., 1860	463–464
Eunema, Salter	464
E.? salteri, n. s., M. & W., 1860	464
Loxonema, Phillips	464
L. scitula, n. s., M. & W., 1860	464–465
L. rugosa, n. s., M. & W., 1860	465
L. cerithiformis, n. s., M. & W., 1860	465
L. inornata, n. s., M. & W., 1860	465
L. nitidula, n. s., M. & W., 1860	465–466
Eulima, Risso	466
E.? peracuta, n. s., M. & W., 1860	466
Macrocheilus, Phillips	466
M. medialis, n. s., M. & W., 1860	466–467
M. intercalaris, n. s., M. & W., 1860	467
M. pulchellus, n. s., M. & W., 1860	467
Soleniscus, n. g., M. & W., 1860	467
S. typicus, n. s., M. & W., 1860	467–468
Cephalopoda	468
Orthoceras, Breynius	468
O. expansum, n. s., M. & W., 1860	468
Cyrtoceras, Goldfuss	468
C. curtum, n. s., M. & W., 1860	468
C.? dilatatum, n. s., M. & W., 1860	468–469
Nautilus, Breynius	469
N. subglobosus, n. s., M. & W., 1860	469
N. chesterensis, n. s., M. & W., 1860	469
N. spectabilis, n. s., M. & W., 1860	469
N. (Discus) planorbiformis, n. s., M. & W., 1860	469–470
N. (Discus) trisulcatus, n. s., M. & W., 1860	470
N. (Discus) digonus, n. s., M. & W., 1860	470
N. (Discus) sangamonensis, n. s., M. & W., 1860	470–471
Goniatites, De Haan	471
G. globulosus, n. s., M. & W., 1860	471
G. iowensis, n. s., M. & W., 1860	471
G. lyoni, n. s., M. & W., 1860	471–472
Subgenus *Oligoporus*,* n. s. g., M. & W., 1860	472

21.

MEEK, F. B., *and* WORTHEN, A. H. Remarks on the age of the Goniatite limestone at Rockford, Indiana, and its relation to the "Black Slate" of the western States, and to some of the succeeding rocks above the latter. <Am. Journ. Sci., vol. xxxii, 2d ser., pp. 167–177. 1861. New Haven, 1861.

The authors conclude it to be probably of Carboniferous age, and, at any rate, much more recent than the Chemung, and not equivalent to any New York rock.

* ὀλίγος, few; and πόρος, opening a pore.



Page.

Gasteropoda.
Holopea, Hall, 1847 251
Subgenus *Isonema*, M. & W 221
H. (Isonema) depressa, n. s., M. & W., 1865 251–252
Pleurotomaria, Defrance, 1825 252
P. (Murchisonia?), meta, n. s., M. & W., 1865 252

Pteropoda.
Conularia, Miller, 1818 252
C. multicostata, n. s., M. & W., 1865 252–253
C. subcarbonaria, n. s., M. & W., 1865 253
C. whitei, n. s., M. & W., 1865 253–254
Tentaculites, Schlotheim, 1820 254
T. tenuistriatus, n. s., M. & W., 1865 254
T. osvegoensis, n. s., M. & W., 1865 254–255
T. sterlingensis, n. s., M. & W., 1865 255

Cephalopoda.
Orthoceras, Auct 255
O. crebristriatum, n. s., M. & W., 1865 255–256
O. subbaculum, n. s., M. & W., 1865 256
O. joliettense, n. s., M. & W., 1865 256
O. nobile, n. s., M. & W., 1865 256–257
O. winchelli, n. s., M. & W., 1865 257
Phragmoceras, Broderip, 1834 257
P. walshii, n. s., M. & W., 1865 257
Gomphoceras, Sowerby, 1839 258
G. sacculum, n. s., M. & W., 1865 258
G. (Apioceras) turbiniforme, n. s., M. & W., 1865 258–259
Nautilus, Linnæus, 1758 259
Subgenus *Endolobus*, M. & W., 1865 259
N. (Endolobus) peramplus, n. s., M. & W., 1865 259
N. (Temnocheilus) niotensis, n. s., M. & W., 1865 260
Subgenus *Discites*, McCoy, 1844 260
N. (Discites) ornatus Hall, var. *amplus*, M. & W., 1865 260–261
N. (Discites) disciformis, n. s., M. & W., 1865 261
N. lasallensis, n. s., M. & W., 1865 261–262
Subgenus *Cryptoceras*, d'Orbigny, 1847 262
N. (Cryptoceras) capax, n. s., M. & W., 1865 262
N. (Cryptoceras?) leidyi, n. s., M. & W., 1865 262–263
Trochoceras, Barrande, 1847 263
T. baeri, n. s., M. & W., 1865 263–264

Articulata.
Crustacea.
Trilobita.
Dalmania, Emmerich, 1845 264
D. danæ, n. s., M. & W., 1865 264–266
Lichas, Dalman, 1827 266
L. cucullus, n. s., M. & W., 1865 266–267
Pratus Steininger, 1830 267
P. ellipticus, n. s., M. & W., 1865 267–268
Phillipsia, Portlock, 1843 268
Subgenus *Griffithides*, Portlock, 1843 268
P. (Griffithides) portlocki, n. s., M. & W., 1865 268–270
P. (Griffithides) scitulus, n. s., M. & W., 1865 270–271
P. (Griffithides?) sangamonensis, n. s., M. & W., 1865 271–273

41.

MEEK, F. B. Note on the affinities of the Bellerophontidæ. <Proc. Chicago Acad. of Sci., pp. 9–11, 1866. Chicago, 1866.

The author places this family near Fissurellidæ, Haliotidæ, and Pleurotomariidæ.

42.

EK, F. B., *and* WORTHEN, A. H. **Contributions to the Paleontology of Illinois and other Western States.** <Proc. Acad. Nat. Sci. Phila., vol. xviii, pp. 251-275, 1866. Philadelphia, 1866.

Carboniferous fossils. Afterward republished and illustrated in the Illinois Geological Reports.

Radiata.

Echinodermata.

Crinoidea.

	Page.
Belemnocrinus whitii, n. s., M. & W., 1866	251
Subgenus *Nematocrinus*, M. & W. 1866	251
Symbathocrinus wachsmuthi, n. s., M. & W., 1866	251-252
Cyathocrinus farleyi, n. s., M. & W., 1866	252-253
Actinocrinus calyculus var. *pardinensis*, M. & W	253
Stratocrinus, n. g., M. & W., 1866	253
Stagnocrinus, n. g., M. & W., 1866	253-254
Rhodocrinus nanus, n. s., M. & W., 1866	254
Onychocrinus, Lyon & Casseday	255-256
Onychocrinus discrus, n. s., M. & W., 1866	256-257
Granatocrinus shumardi, n. s., M. & W., 1866	257-258
Granatocrinus norwoodi, O. & S.?	258-259

Asteroidea.

Schenaster wachsmuthi, n. s., M. & W., 1866	259

Mollusca.

Lamellibranchiata.

Pteria (*Pterinea*?) *meekana*, n. s., M. & W., 1866	259-260
Dolabra sterlingensis, n. s., M. & W., 1866	260-261
Macrodon micronema, n. s., M. & W., 1866	261

Gasteropoda.

Platyceras, Conrad, 1840	262-263
Subgenus *Orthonychia*, Hall	263
Subgenus *Igoceras*, Hall	263
P. laevigatum, n. s., M. & W., 1866	263-264
P. haliotoides, n. s., M. & W., 1866	264
P. unicum, n. s., M. & W., 1866	264-265
P. (Orthonychia) chesterense, n. s., M. & W. 1866	265

43.

MEEK, F. B., and WORTHEN, A. H. Descriptions of Paleozoic fossils from the Silurian, Devonian, and Carboniferous rocks of Illinois and other Western States. <Proc. Chicago Acad. Sci., pp. 11–23. 1866. Chicago, 1866.

Genera Monopteria Megaptera afterward republished in the Illinois Geological Reports, vol. ii.

Amorphozoa.

	Page.
Astylospongia ? carbonaria, n. s., M. & W., 1866	11–12
Astræospongia hamiltonensis, n. s., M. & W., 1866	12

Mollusca.

Lamellibranchiata.

Placunopsis carbonaria, n. s., M. & W., 1866	13
Aviculopecten randolphensis, n. s., M. & W., 1866	14
A. indianensis, n. s., M. & W., 1866	14–15
A. fimbriatus, n. s., M. & W., 1866	15–16
Vanuxemia dixonensis, n. s., M. & W., 1866	16–17
Macrodon tenuistriatus, n. s. g., M. & W., 1866	17
Schizodus curtus, n. s., M. & W., 1866	18
Anthracoptera ? fragilis, n. s., M. & W., 1866	18–19
Myalina meliniformis, n. s., M. & W., 1866	19–20
Monopteria, n. s., g., M. & W., 1866	20
Pterinea (Monopteria) gibbosa, n. s., M. & W., 1866	20–21
Pterinea ? subpapyracea, n. s., M. & W., 1866	21–22
Ambonychia (Megaptera) casei, n. s., M. & W., 1866	22–23

44.

MEEK, F. B., and WORTHEN, A. H. Descriptions of Invertebrates from the Carboniferous System. <Geological Survey of Illinois, vol. ii, pp. 145–411, plates, 14–20 and 23–32. 1866. Published by authority of the legislature of Illinois, Springfield, 1866.

Genera Sphenopoterium, Cardiopsis, Trematodiscus, Strotocrinus, Steganocrinus, Cælocrinus, Oligoporus, Erisocrinus, Syntrielasma, Eumicrotis, Trachydomia, Orthonema, Soleniscus, Acanthotelson, Palæocaris, Anthracoerpes, Palæocampa, Shænaster. Volumes ii, iii, v, and vi of these reports all comprise very important works on Invertebrate Paleontology, in which are not only species and genera described, but higher groups are defined, and many important questions are philosophically discussed.

INVERTEBRATE FOSSILS OF THE KINDERHOOK GROUP.

Protozoa.

Spongiæ.

	Page.
* *Sphenopoterium*, M. & W., 1860	145–146
S. enorme, M. & W., 1860, pl. xiv, figs. 1 *a*, 1 *b*	146
S. enorme var. *depressum*, M. & W., 1866, pl. xiv, figs. 2 *a*, 2 *b*	146

Radiata.

Echinodermata.

Crinoidea.

Actinocrinus, Miller	147–149
Batocrinus, Casseday (*Eretmocrinus* Lyon ?)	150–151
Subgenus *Batocrinus*, Casseday	151
Sec. C. (*Uperocrinus*, M. & W.)	151
Actinocrinus (*Batocrinus*) *pistilliformis*, M. & W., 1861, pl. xiv, fig. 8	151–153

Mollusca.

Brachiopoda.

Rhynchonella, Fischer, 1809	153
R. missouriensis, Shumard, 1855, pl. xiv, figs. 4 *a*, 4 *b*	153–154
Spirifer, Sowerby, 1815	155
Subgenus *Martinia*, McCoy, 1844	155
S. (Martinia) cooperensis, Swallow, 1860, pl. xiv, figs. 5 *a*, 5 *b*	155–156

* σφην, a wedge, ποτηριον, a drinking cup.

Goniatites, de Haan, 1825.....
G. lyoni, M. & W., 1860, pl. xiv, figs. 11 *a–c*.....

INVERTEBRATE FOSSILS OF THE BURLINGTON GROUP.

Radiata.

Echinodermata.

Crinoidea.

Dichocrinus, Miller, 1821.....
D. conus, M. & W., 1860, pl. xvi, figs. 5 *a*, *b*.....
Platycrinus, Miller, 1821.....
Centrocrinus, Austin.....
Pleurocrinus, Austin.....
Marsupiocrinites, Phillips.....
Subgenus *Pleurocrinus*, Austin.....
* *Platycrinus* (*Pleurocrinus*) *subspinosus*, Hall, 1858, pl. xv, fig. 6.....
* *Cyathocrinus*, Miller, 1821.....
C. sculptilis, Hall, 1860, pl. xv, fig. 2 *a*, *b*.....
Poteriocrinus, Miller, 1821.....
P. swallovi, M. & W., 1860, pl. 16, figs. 4 *a*, *b*, and fig. 3, p. 184.....
Zeacrinus, Troost.....
Z. troostanus, M. & W., 1860, pl. xvi, fig. 2 and fig. 4, p. 187.....
Strotocrinus,* M. & W., [1866].....
S. perumbrosus?, Hall, fig. 5, p. 188.....
S. regalis, sp., Hall, 1860, pl. xvi, figs. 6 *a*, *b*, fig. 6, p. 191, fig. 7, p. 192, and fig. 8,
Steganocrinus, n. g., M. & W. [1866].....
S. pentagonus,† Hall, figs. 9 *a*, *d*.....
S. sculptus, Hall, figs. 10, *a*, *b*, and *d*. p. 197.....
S. arancolus, M. & W., 1860, pl. xv, figs. 1 *a*, *b*.....
Actinocrinus, Miller, 1821.....
A. concinnus, Shumard, 1855, pl. xv, figs 9 *a*, *b*., fig. 11, p. 202.....
A. scitulus, M. & W., 1860, pl. xv, figs. 7 *a*, *b*, and fig. 12, p. 204.....
A. sillimani, M. & W., 1860, fig. 13, p. 204.....
Subgenus *Batocrinus*, Casseday.....
A. (*Batocrinus*) *dodecadactylus*, M. & W., 1861, pl. xv, figs. 3 *a–c*., fig. 14, p. 2
A. Batocrinus asteriscus, M. & W., 1860, pl. xv, figs. 8 *a–c*.....
Amphoracrinus, Austin, 1848.....
A. subturbinatus, M. & W., 1860, pl. xv, figs. 4 *a*, *b*., and fig. 15, p. 213.....
Coelocrinus, ‡M. & W., 1865.....
C. concavus, M. & W., 1861, pl. xv, figs. 10 *a–c*., and fig. 16, p. 215.....
Gilbertocrinus, Phillips.—Ollerenshaw, Cumberland.

Page

Palaechinidæ, McCoy.
Archæocidaridæ, McCoy.
Palaechinus, McCoy, 1844 229
P. burlingtonensis, M. & W., 1860, pl. xvi, figs. 3 *a–c*, and fig. 23, p. 231 230–231
Mollusca.
Lamellibranchiata.
Aviculopecten, McCoy, 1851 231
A. burlingtonensis, M. & W., 1860, pl. xvi, figs. 1 *a*, *b* 231–232

INVERTEBRATE FOSSILS OF THE KEOKUK GROUP.

Protozoa.
Spongiæ.
Petrospongia.
Sphenopoterium, M. & W., 1860 233
S. obtusum, M. & W., 1860, pl. xvii, figs. 2 *a-d* (by error *a* on pl.), 2 *e* 233
S. compressum, M. & W., 1860, pl. xvii, figs. 1 *a–e* 234
Radiata.
Echinodermata.
Crinoidea.
Cyathocrinus, Miller, 1821 234
C. angulatus, M. & W., 1860, pl. xvii, fig. 4 234–236
C. safordi, M. & W., 1860, pl. xvii, figs. 5 *a* and *b*, and fig. 24, p. 237 236–237
Poteriocrinus, Miller 237
Subgenus *Scaphiocrinus*, Hall, 1858 237
P. (Scaphiocrinus) decadactylus, M. & W., 1860, pl. xvii, fig. 6 and fig. 25, p. 240 238–240
Zeacrinus, Troost 240
Z. planobrachiatus, M. & W., 1860, pl. xviii, fig. 5 240–241
Onychocrinus, Lyon & Casseday, 1859 242–244
O. monroensis, M. & W., 1861, pl. xvii, fig. 7 244–245
O. norwoodi, M. & W., 1860, pl. xvii, fig. 3, and fig. 26, p. 247 245–247
Echinoidea.
Perischœchinidæ.
**Oligoporus*, M. & W., 1860 247
Melonites multipora, fig. 27 248
Oligoporus danæ, M. & W., 1860, pl. xvii, fig. 8 and fig. 28, p. 248 248–251
Mollusca.
Brachiopoda.
Camarophoria, King, 1844.
C. subtrigonia, M. & W., 1860, pl. xviii, figs. 8 *a–c* 251–253
Chonetes, Fischer, 1837.
C. planumbona, M. & W., 1860, pl. xviii, figs. 1 *a–d* 253–254
Athyris, McCoy, 1844.
A. planosulcata, Phillips? (sp.), 1836, pl. xxii, figs. 8 *a–d* 254–255
Lamellibranchiata.
Aviculopecten, McCoy, 1851 256
A. owenî, M. & W., 1860, pl. xviii, figs. 2 *a–c* 256
A. amplus, M. & W., 1860, pl. xviii, figs. 4 *a–c* 257–258
A. oblongus, M. & W., 1860, pl. xviii, figs. 3*a* and *b* 258–259
Gasteropoda.
Pleurotomaria, Defrance, 1826 260
P. shumardi, M. & W., 1860, pl. xviii, figs. 6*a* and *b* 260–261

INVERTEBRATE FOSSILS OF THE ST. LOUIS GROUP.

Protozoa.
Spongiæ.
Petrospongia.
Sphenopoterium, M. & W.
S. cuneatum, M. & W., 1860, pl. xix, figs. 1 *a–d* 263–263
Radiata.
Echinodermata.
Crinoidea.
Dichocrinus, Munster.
D. constrictus, M. & W., 1860, pl. xix, figs. 2 *a–c* 263–264
Platycrinus, Miller, 1821 264
P. prattenanus, M. & W., 1860, pl. xx, fig. 2 264–265

* Ὀλιγος, few; Πορος, a passage.

P

P. pentoilus, M. & W., 1860, pl. xix, figs. 6 *a–c* 28
P. plenus, M. & W., 1860, pl. xx, fig. 3 28
Taxocrinus, Phillips, 1843 28
Forbesiocrinus, de Koninck & Le Hon, 1854 .....
Taxocrinus semiovatus, M. & W., 1860, pl. xx, figs. 4 *a–b* 27
Blastoidea.
Granatocrinus, Troost, 1850 27
G. cornutus, sp., M. & W., 1860, pl. xx, fig. 1 .....
Asteroidea.
**Schœnaster*, M. & W. [1860] 27
S. ambriatus, M. & W., 1860, pl. xix, figs. 7 *a–d* 28
Mollusca.
Brachiopoda.
Productus, Sowerby, 1814 .....
P. scitulus, M. & W., 1860, pl. xx, figs. 5 *a–d* 28
Lamellibranchiata.
Myalina, de Koninck, 1844 .....
M. concentrica, M. & W., 1860, pl. xix, figs. 3 *a–c* 28
Yoldia, Moller, 1842 .....
Y. ? levistriata, M. & W., 1860, pl. xx, figs. 7 *a* and *b* 28
Nuculana, Link, 1807 .....
N. ? curta, M. & W., 1861, pl. xx, figs. 6 *a* and *b* 28
Gasteropoda.
Dentalium, Linnæus, 1758 .....
D. venustum, M. & W., 1861, pl. xix, fig. 8 .....
Straparollus, Montfort, 1810 .....
S. similis, M. & W., 1861, pl. xix, figs. 4 *a–b* 28
S. similis var. *planus*, M. & W., 1861, pl. xix, fig. 5 *a–c* .....
Cephalopoda.
Orthoceras, Auct. .....
O. expansum, M. & W., 1860, pl. xx, figs. 8 *a–c* 29

INVERTEBRATE FOSSILS OF THE CHESTER GROUP.

Radiata.
Echinodermata.
Crinoidea.
Pterotocrinus, Lyon & Casseday, 1859 29
P. crassus, M. & W., 1860, pl. xxiii, figs. 2 *a*, *b*, and fig. xxix, p. 292 29
P. chesterensis, M. & W., 1860, pl. xxiii, figs 1 *a–c*, and fig. 30, p. 293 29
Echinoidea.
Perischœchinidæ.
Archæocidaris, McCoy, 1844 29
A. muconata, M. & W., 1860, pl. xxiii, figs. 3 *a–c* 29
Mollusca.
Brachiopoda.
Productus, Sowerby, 1812 .....
P. parvus, M. & W., 1860, pl. xxiii, figs. 4 *a–c* 29
Spirifer, Sowerby, 1815 .....
Subgenus *Martinia*, McCoy, 1844 .....
S. (Martinia) glaber var. *contractus*, M. & W., pl. xxiii, figs. 5 *a*, *b* 29
Lamellibranchiata.
Myalina de Koninck, 1844 .....
M. angulata, M. & W., 1860, pl. xxiii, figs. 7 *a*, *b* 30
Schizodus, King, 1844 .....
S. chesterensis, M. & W., 1865, pl. xxiii, figs. 6 *a*, *b* 30
Gasteropoda.
Straparollus, Montfort, 1810 .....
S. planidorsatus, M. & W., 1860, pl. 24, figs. 2 *a–c* 30
Pleurotomaria, Defrance, 1826 .....
P. chesterensis, M. & W., 1860, pl. xxiv, figs. 1 *a–c* 30
Cephalopoda.
Orthoceras, Auct. .....
O. annulato-costatum, M. W., 1861, pl. xxiv, figs. 3 *a*, *b* 30

*σχοινος, a rope; αστηρ, a star.

Page.
Nautilus, Linnæus, 1758 305
N. globatus, Sowerby? 1825, pl. xxiv, figs. 5 *a*, *b* 305–306
N. chesterensis, M. & W., 1860, pl. xxiv, figs. 4 *a*, *b* 306–307
Subgenus *Endolobus*,* M. & W., 1865 307–308
N. (Endolobus) spectabilis, M. & W., 1860, pl. xxv, figs. 1 *a*, *b* 308–309

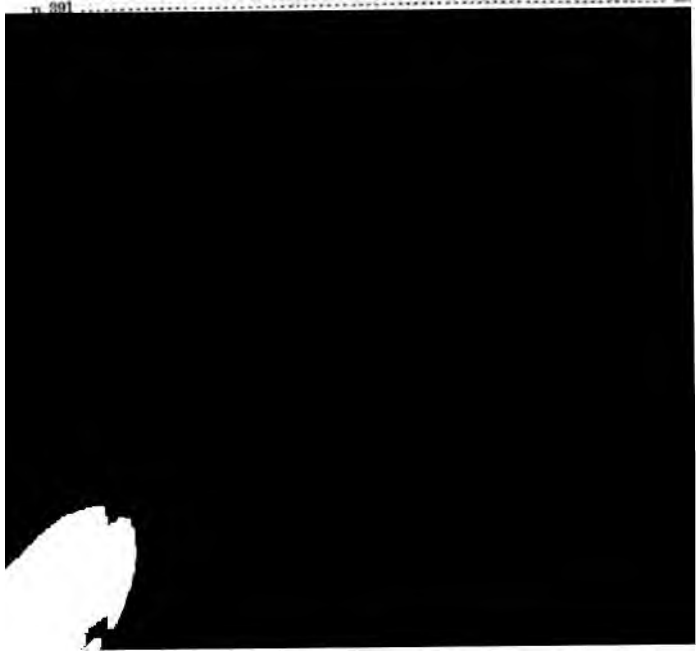
INVERTEBRATE FOSSILS OF THE COAL MEASURES.

Radiata.
Crinoidea.
Cyathocrinus, Miller, 1821 310
C.? sangamonensis, M. & W., 1861, pl. xxvi, figs. 1 *a*, *b*, and fig. 31, p. 311 310–312
Zeacrinus, Troost 312
Z. discus, M. & W., 1860, pl. xxvi, figs. 3 *a*, *b* 312–313
Z.? crassus, M. & W., 1860, pl. xxvi, figs. 2 *a*, *b*, and fig. 32, p. 315 314–315
Erisocrinus, M. &. W., 1865 315–317
E. typus, M. & W., 1865, fig. 33, p. 317, and fig. 34 *a–c*, p. 318 317–318
E. conoideus, M. & W., 1865, figs. 35 *a*, *b* 318–319
E. tuberculatus, M. & W., 1865 319–320
Mollusca.
Brachiopoda.
Productus, Sowerby, 1812 320
P. nanus, M. & W., 1860, pl. xxvi, figs. 4 *a–d* 320–321
Syntrielasma, M. & W., 1865 321–323
S. hemiplicata, Hall, (sp.), 1862, figs. 36 *a–c*, p. 322, and fig. 37 *a*, *b*, p. 324 322–325
Lamellibranchiata.
Aviculopecten, McCoy, 1852 326
A. coxanus, M. & W., 1860, pl. xxvi, fig. 6 *a*, b 326–327
A. pellucidus, M. & W., 1860, pl. xxvi, fig. 5 *a*, *b* 327–328
A. koninckii, M. & W., 1860, pl. xxvi, fig. 8 328–329
A. interlineatus, M. & W., 1860, pl. xxvi, fig. 7 *a*, b 329–330
A. occidentalis, Shumard? 1855 pl. xxvii, figs. 4, 5, 5 *a* 331–332
Streblopteria, McCoy, 1851 332–334
S.? tenuilineata, M. & W., 1860, pl. xxvi, figs. 9 *a*, *b* 334–336
Eumicrotis, Meek, 1864 336–337
E. hawni var. *sinuata*, M. & W. [1866], pl. xxvii, figs. 12 *a*, 12 *b*, 13, 14 338–339
Pterinea, Goldfuss, 1833 339
Subgenus *Monopteria*,† M. & W., 1866 339–340
P. (Monopteria) gibbosa, M. & W., 1866, pl. xxvii, figs. 11, 11 *a*, *b* 340–341
Myalina, de Koninck, 1844 341
M. swallovi, McChesney, 1860, pl. xxvii, figs. 1 *a–d* 341–342
M. meliniformis, M. & W., 1866, pl. xxvii, fig. 3 343–344
M. recurvirostris, M. & W., 1860, pl. xxvi, figs. 9 *a–c* 344–345
Schizodus, King, 1844 345
Schizodus, ——, sp.?, pl. xxvii, fig. 7 345–346
Edmondia, de Koninck, 1844 346
E. unioniformis, sp., Phillips, 1836, pl. xxvii, figs. 6, 6 *a* and *b* 346–347
Pleurophorus, King, 1844 347
P. subcostatus, M. & W., 1865, pl. xxvii, figs. 2, 2 *a* 347–349
Solenomya, Lamarck, 1819 349
S. radiata, M. & W., 1860, pl. xxvi, fig. 10 *a*, *b* 349–350
Allorisma, King, 1844 350
Allorisma, sp. undt., pl. xxvii, figs. 9, 9 *a* 350
Gasteropoda.
Pleurotomaria, Defrance, 1826 351
P. subconstricta, M. & W., 1860, pl. xxviii, figs. 6 *a–c* 351–352
P. speciosa, M. & W., 1860, pl. xxviii, figs. 5 *a–c* 352–353
P. scitula, M. & W., 1860, pl. xxviii, figs. 9 *a–d* 353–354
P. brazoensis, Shumard? 1860, pl. xxviii, figs. 1 *a–d* 354–355
P. tenuicincta, M. & W., 1860, pl. xxviii, fig. 3 *a–d* 355–356
P. granulo-striata, M. & W., 1860, pl. xxviii, fig. 2 *a–d* 356–357
P. pratteni, M. & W., 1860, pl. xxviii, fig. 7 *a–d* 357–358
P. subsinuata, M. & W., 1860, pl. xxvii, figs. 4 *a–d* 358–359
P. turbiniformis, M. & W., 1860, pl. xxviii, figs. 8 *a–c* 359–360

*ενδον, within; λοβος, a lobe. †μονος, solitary; πτερον, a wing.

Page.

? subcalaris, M. & W., 1860, pl. xxviii, figs. 19 *a*, *b* (by error on pl. 1 *a*, *b*) 38-1
? f turnida, M. & W., 1860, pl. xxxi, figs. 1 *a*, *b* 38-1
Craparollus, Montfort, 1810 1
? umbilicatus, M. & W., 1860, pl. xxix, figs. 1 *a–c* 38-1
Taticopsis, McCoy, 1844 38-1
Taticopsis nana, M. & W., 1860, pl. xxxi, figs. 4 *a*, *b* 38-1
ubgenus *Trachydomia*,* M. & W, 1858 1
?. (Trachydomia) nodosa, M. & W., 1860, pl. xxxi, figs. 2 *a*, *b* 38-1
?. (Trachydomia) nodosa, var. *hollidayi*, M. & W., 1860, pl. xxx, figs. 3 *a*, *b* 1
Macrocheilus, Phillips, 1841 38-1
M. medialis, M. & W., 1865, pl. xxxi, figs. 5 *a*, *b* 38-1
M. intercalaris, M. & W., 1860, pl. xxxi, figs. 6 *a*, *b* 38-1
Macrochellus, sp. undt., pl. xxvii, fig. 10 38-1
Polyphemopsis, Portlock, 1843 38-1
P. inornata, H. & W., 1860, pl xxxi, figs. 8 *a–c* 38-1
P. nitidula, M. & W., 1860, pl. xxxi, figs. 9 *a*, *b* 38-1
P. peracuta, M. & W., 1860, pl. xxxi, figs. 7 *a*, *b* 38-1
Loxonema, Phillips, 1841 38-1
L. scitula, M. & W., 1860, pl. xxxi, figs. 10 *a–c* 38-1
L. rugosa, M. & W., 1860, pl. xxxi, figs. 11 *a–c* 38-1
L. multicostata, n. s., M. & W., 1866, pl. xxxi, figs. 12 *a–c* 38-1
L. cerithiformis, M. & W., 1860, pl. xxxi, figs. 13 *a–c* 38-1
†*Orthonema*, M. & W., 1861 38-1
O. salteri, M. & W., 1860, pl. xxxi, figs. 14 *a–c* 38-1
Turritella, Lamarck, 1799 38-1
T. ? stevensana, n. s., M. & W., 1866, pl. xxvii, figs. 8 and 8 *a* 38-1
§*Soleniscus*, M. & W., 1860 38-1
S. typicus, M. & W., 1860, pl. xxxi, figs. 15 *a* and *b* 38-1
Bellerophon, Montfort, 1808 38-1
B. crassus, M. & W., 1860, pl. xxxi, figs. 16 *a* and *b* 38-1
halopoda.
Nautilus, Linnæus, 1758 38-1
N. planorbiformis, M. & W., 1860, pl. xxix, figs. 4 *a–c* 38-1
N. sangamonensis, M. & W., 1860, pl. xxix, figs. 3, 3 *a*, *b* 38-1
Cyrtoceras, Goldfuss, 1833 38-1
C. (Aploceras) curtum, M. & W., 1860, pl. xxx, figs. 1 *a–c* 38-1
C. ? dilatatum, M. & W., 1860, pl. xxix, fig. 2 38-1
Goniatites, de Haan, 1825 38-1
G. globulosus, M. & W., 1860, pl. xxx, figs. 2 *a–c*, and fig. 38, p. 390, and fig. 39, p. 391 38-1



Page.

Insecta.

Lepidoptera.

Palæocampa, [*]M. & W. [1865]..... 401

P. anthrax, M. & W., 1865, pl. xxxii, fig. 3..... 410–411

45.

MEEK, F. B. Check-lists of the Invertebrate fossils of North America. Cretaceous and Jurassic. <Smithsonian Miscellaneous Collections (No. 177), pp. 1–40. 1864. Washington, 1867.

Contains, besides list, "Notes and explanations" of generic and specific characters of much importance.

The following species are discussed in the notes and explanations:

CRETACEOUS.

Page.

Planularia cuneata, Mort. = *Phonemus* (*Flabellina*) *cuneatus*, (Mort.) Meek..... 31

Palmula sagittaria, Lea = *Phonemus* (*Flabellina*) *sagittarius*, (Lea) Meek..... 31

Orbitulites texanus, Rœmer = *Tinoporus* (*Orbitolina*) *texanus*, (Rœmer) Meek..... 31

Grammostomum phyllodes, Ehrenburg = *Textularia phyllodes*, (Ehrenburg) Meek..... 31

Plagiostoma echinatum, Mort. = *Spondylus echinatus*, (Mort.) Meek..... 31

Ctenoides acutilineata, Con. = *Lima acutilineata*, (Con.) Meek..... 31

Ctenoides denticulata, Gabb. = *Lima denticulata*, (Gabb.) Meek..... 31

Plagiostoma pelagicum, Mort. = *Lima pelagica*, (Mort.) Meek..... 31

Ctenoides squarrosa, Gabb. = *Lima squarrosa*, (Gabb.) Meek..... 31

Syncyclonema, Meek..... 31

Pecten rigida, H & M. = *Syncyclonema ? rigida*, (H. & M.) Meek..... 31

Leda bisulcata, M. & H. = *Nuculana bisulcata*, (M. & H.) Meek..... 31

Leda longifrons, Con. = *Nuculana longifrons*, (Con.) Meek..... 32

Leda pinnæformis, Gabb. = *Nuculana pinnæformis*, (Gabb.) Meek..... 32

Leda protexta, Gabb. = *Nuculana protexta*, (Gabb.) Meek..... 32

Leda slackiana, Gabb. = *Nuculana slackiana*, (Gabb.) Meek..... 32

Leda subangulata, Gabb. = *Nuculana subangulata*, (Gabb.) Meek..... 32

Avicula abrupta, Con. = *Pteria abrupta*, (Con.) Meek..... 32

Avicula convexo-plano, Rœmer = *Pteria convexo-plano*, (Rœmer) Meek..... 32

Avicula cretacea, Con. = *Pteria cretacea*, (Con.) Meek..... 32

Avicula haydeni, H. & M. = *Pteria haydeni* (H. & M.) Meek..... 32

Avicula iridescens, Shumard = *Pteria iridescens*, (Shum.) Meek..... 32

Avicula laripes, Mort. = *Pteria laripes*, (Morton) Meek..... 32

Avicula linguiformis, E. & S. = *Pteria linguiformis*, (E. & S.) Meek..... 32

Avicula nebrascana, E. & S. = *Pteria nebrascana*, (E. & S.) Meek..... 32

Avicula pedernalis, Rœmer = *Pteria pedernalis*, (Rœmer) Meek..... 32

Avicula petrosa, Conrad = *Pteria petrosa*, (Con.) Meek..... 32

Avicula planisulca, Rœmer = *Pteria planisulca*, (Rœmer) Meek..... 32

Avicula subgibbosa, M. & H. = *Pteria subgibbosa*, (M. & H.) Meek..... 32

Avicula triangularis, E. & S. = *Pteria triangularis*, (E. & S.) Meek..... 32

Actinoceramus, Meek..... 32

Inoceramus sulcatus, Parkinson = *Inoceramus* (*Actinoceramus*) *costellatus*, Con..... 32

Volsella attenuata, M. & H. = *Modiola attenuata*, M. & H..... 32

Volsella concentrico-costellata, Rœmer = *Modiola concentrico-costellata*, Rœmer..... 32

Volsella cretacea, Con. = *Modiola cretacea*, Conrad..... 32

Volsella juliæ, Lea = *Modiola juliæ*, Lea..... 32

Volsella meekii, Evans & Shumard = *Modiola meekii*, E. & S..... 32

Volsella pedernalis, Rœmer = *Modiola pedernalis*, Rœmer..... 32

Volsella saffordi, Gabb. = *Modiola saffordi*, Gabb..... 32

Modiola granulato-cancellata, Rœmer = *Crenella granulato-cancellata*, (Rœmer) Meek..... 32

Liopistha, Meek..... 32

Cardium elegantulum, Rœmer = *Papyridea* (*Liopistha*) *elegantula*, (Rœm.) Con..... 32

Corbula sp. ind., Owen = *Papyridea* (*Liopistha*) *rostrata*, Meek..... 33

Cardium ? sancti-sabæ, Rœmer = *Papyridea ? sancti-sabæ*, (Rœm.), Meek..... 33

Cyprina arenaria, M. & H. = *Cyrena arenaria*, (M. & H.) Meek..... 33

Cyprina humilis, M. & H. = *Venilia humilis*, (M. & H.) Meek..... 33

Venilia quadrata, Gabb. = *Venilia gabbana* Meek..... 33

[*] παλαιος, ancient; χαμπη, a caterpillar.

Page.

Cyprina subtumida, M. & H. = *Venilia subtumida*, (M. & H.) Meek 32
Cyprina laphami, Shumard = *Venilia laphami*, (Shum.) Meek 32
Venus ? circularis, M. & H. = *Cyclina ? circularis*, (M. & H.) Meek 32
Callista eufalensis, Con. = *Dione eufalensis*, (Con.) Meek 32
Cytherea deweyi, M. & H. = *Dione Deweyi*, (M. & H.) Meek 32
Cytherea leonensis, Con. = *Dione leonensis*, (Con.) Meek 32
Cytherea lamarensis, Shum. = *Dione lamarensis*, (Shumard) Meek 33
Cytherea missouriana, Mort. = *Dione missouriana*, (Morton) Meek 33
Cytherea nebrascensis, M. & H. = *Dione nebrascensis*, M. & H 33
Cytherea orbiculata, H. & M. = *Dione orbiculata*, (H. & M.) Meek 33
Cytherea owenana, M. & H. = *Dione owenana*, (Meek & Hayden) Meek 33
Cytherea pellucida, M. & H. = *Dione ? pellucida*, (M. & H.) Meek 33
Cytherea texana, Conrad = *Dione texana*, (Con.) Meek 33
Cytherea tippana, Conrad = *Dione tippana*, (Con.) Meek 33
Venus meekiana, Gabb. = *Dione* [?] *meekiana*, (Gabb) Meek 33
Venus ripleyana, Gabb. = *Dione* [?] *ripleyana*, (Gabb) Meek 33
Cytherea tenuis, H. & M, = *Dione* [?] *tenuis*, (H. & M.) Meek 34
Tellina formosa, M. & H. = *Abra ? formosa*, (M. & H.) Meek 34
Solen irradians, Rœmer = *Linearia irradians*, (Rœmer) Meek 34
Psammobia cancellato-sculpta, Rœmer = *Linearia cancellato-sculpta*, (Rœmer), Meek .. 34
Cymella, Meek 34
Pholadomya undata, M. & H. = *Pholadomya* (*Cymella*) *undata*, (M. & H.) 34
Leda fibrosa, Evans & Shumard = *Neæra fibrosa*, (E. & S.) Meek 34
Goniochasma, Meek 34
Xylophaga stimpsoni, M. & H. = *Goniochasma stimpsoni*, (M. & H.) Meek 34
Xylophagella, Meek 34
Xylophaga elegantula, M. & H. = *Xylophagella elegantula*, (M. & H.) Meek 34
Ringicula pulchella, Shumard = *Cinulia* (*Avellana*) *pulchella*, (Shum.) Meek 34
Actæonina naticoides, Gabb. = *Cinulia naticoides*, (Gabb) Meek 35
Ringicula subpellucida, Shumard = *Ringinella subpellucida*, (Shum.) Meek 35
Ringicula acutispira, Shumard = *Riginella acutispira*, (Shum.) Meek 35
Actæonina biplicata, Gabb. = *Solidula biplicata*, (Gabb) Meek 35
Scalpellum inequicostatum, Shumard = *Anisomyon ? inæquicostatus*, (Shum.) 35
Capulas occidentalis, H. & M. = *Tectura ? occidentalis*, (H. & M.) Meek 35
Phasianella haleana, d'Orbigny = *Eutropia haleana*, (d'Orb.) Meek 35
Phasianella perovata, Shumard = *Eutropia perovata*, Shumard 35
Phasianella punctata, Gabb. = [*Eutropia*] *punctata*, Gabb 35
Architectonica abotti, Gabb. = *Margaritella abotti*, (Gabb) Meek 35
Solarium abyssinus, Gabb. = *Margarita abyssinus*, (Gabb) Meek 35
Nerita (*Neretis*) *densata*, Conrad = *Neritella* (*Neretis*) *densata*, (Con.) Meek 35
Natica ambigua, M. & H. = *Vanikoro ambigua*, (M. & H.) Meek 35
Natica tuomeyana, M. & H. = *Neritopsis ? tuomeyana*, (M. & H.) Meek 35
Spironema, Meek 35
Turbo tenuilineata, M. & H. = *Spironema tenuilineata*, (M. & H.) Meek 35
Tuba ? bella, Conrad = *Spironema bella*, (Con.) Meek 35
Rostellaria biangulata, M. & H. = *Anchura ? biangulata*, (M. & H.) Meek 35
Aporrhais parva, M. & H. = *Anchura ? parva*, (M. & H.) Meek 35
Aporrhais sublævis, M. & H. = *Anchura ? sublævis*, (M. & H.) Meek 35
Drepanocheilus, Meek 35
Rostellaria americana, Evans & Shum. = *Anchura* (*Drepanoch*[*e*]*ilus*) *americana*, (Evans & Shumard) Meek 35–36
Aporrhais decemlirata, Conrad = *Anchura* (*Drepanoch*[*e*]*ilus*) *decemlirata*, (Con.) Meek. 36
Rostellaria nebrascensis, Evans & Shumard = *Anchura* (*Drepanoch*[*e*]*ilus*) *nebrascensis*, (E. & S.) Meek 36
Rostellaria rostrata, Gabb. = *Anchura* (*Drepanoch*[*e*]*ilus*) *rostrata*, (Gabb) Meek 36
Isopleura, Meek 36
Rimella curviliratа, Conrad = *Isopleurus curviliratus*, (Con.) Meek 36
Chemnitzia meekiana, Gabb. = *Isopleurus meekianus*, (Gabb) Meek 36
Pterocerella, Meek 36
Harpago tippana = *Pterocerella tippana*, (Con.) Meek 36
Chemnitzia, Conrad, 1860 (not d'Orb) = *Chemnitzia corona* (Con.), Meek 36
Scalaria texana, Rœmer = *Chemnitzia ? texana*, (Rœmer) Meek 36
Scalaria forshayii, Shumard = *Scala forshayii*, (Shumard) Meek 36
Natica acutispira, Shumard = *Lunatia ? acutispira*, (Shumard) Meek 36
Volutilithes bella, Gabb. = *Rostellites bellus*, (Gabb) Meek 36

	Page.
Volutilithes biplicata, Gabb.= *Rostellites biplicatus*, (Gabb) Meek	36
Volutilithes conradi, Gabb.= *Rostellites conradi*, (Gabb) Meek	36
Volutilithes nasuta, Gabb.= *Rostellites nasutus*, (Gabb), Meek	36
Trachytriton, Meek	37
Fusus? vinculum, H. & M. = *Trachytriton vinculum*, (H. & M.) Meek	37
Pleurotomaria texana, Shumard = *Turris texanus*, (Shumard) Meek	37
Piestochilus, Meek, n. g. 1864	37
Fusus scarboroughi, M. & H. = *Clavellithes (Piestochilus) scarboroughi*, (M. & H.) Meek	37
Fusus vaughani, M. & H. = *Cantharus? vaughani*, (M. & H.) Meek	37
Fusus? flexicostatus, M. & H. = *Pyrifusus? flexicostatus*, (M. & H.) Meek	37
Fusus haleanus, d'Orbigny = *Pyrifusus? haleanus*, (d'Orb.) Meek	37
Neptunea impressa, Gabb.= *Pyrifusus? impressus*, (Gabb) Meek	37
Fusus intertextus, M. & H. = *Pyrifusus intertextus*, (M. & H.) Meek	37
Fusus newberryi, M. & H. = *Pyrifusus newberryi*, (M. & H.) Meek	37–38
Fusus subturritus, M. & H. = *Pyrifusus subturritus*, (M. & H.) Meek	38
Fusus? tenuilineatus, H. & M. = *Tritonifusus? tenuilineatus*, (H. & M.) Meek	38
Pleurotomaria mullicaensis, Gabb = *Fusus mullicaensis*, Gabb	38
Pyrula bairdi, M. & H. = *Tudicla (Pyropsis) bairdi*, (M. & H.) Meek	38
Fusus? dakotensis, M. & H. = *Tudicla? dakotensis*, (M. & H.) Meek	38
Hamites leai, Troost = *Ptychoceras leai*, (Troost) Meek	38
Hamites verneuilii, Troost = *Ptychoceras verneuilii*, (Troost) Meek	38
Turrilites sp. undt. = *Heteroceras oweni*, Meek	38
Helicoceras tortum, M. & H. = *Heteroceras tortum*, (M. & H.) Meek	38
Helicoceras? angulatum, M. & H. = *Heteroceras? angulatum*, (M. & H.) Meek	38
Turrilites cheyennensis, M. & H. = *Heteroceras? cheyennensis*, (M. & H.) Meek	38
Nautilus orbiculatus, Tuomey = *? Aturia orbiculata*, (Tuomey) Meek	38
Belemnites paxillosa, Lamarck = *Belemnitella paxillosa*, (Lamarck) Meek	38
Vermetus rotula, Morton = *Spirulæa rotula*, (Morton) Meek	38

JURASSIC.

Camptonectes, Agassiz, MSS. [1864]	39
Pecten bellistriatus, Meek = *Camptonectes bellistriatus*, Meek	39
Pecten extenuatus, M. & H. = *Camptonectes? extenuatus*, (M. & H.) Meek	39
Avicula? curta, Hall = *Eumicrotis curta*, (Hall) Meek	39
Oxytoma, Meek	39
Avicula munsteri, Brown = *Pteria (Oxytoma) munsteri*, (Brown?) Meek	39
Modiola pertenuis, M. & H. = *Volsella pertenuis*, (M. & H.) Meek	40
Modiola (Perna) formosa, M. & H. = *Volsella formosa*, (M. & H.) Meek	40
Venus unionides, Rœmer = *Myacites unionoides*, (Rœmer) Meek	40
Neritina nebrascensis, Meek = *Neritella nebrascensis*, M. & H.	40
Lioplacodes, Meek	40
Melania (Potadoma) veterna, M. & H. = *Lioplacodes veterna*, (M. & H.) Meek	40

46.

MEEK, F. B. Check lists of the Invertebrate fossils of North America. Miocene. <Smithsonian Miscellaneous Collections (No. 183), pp. 1–32, 1864. Washington, 1867.

Contains, besides the list, "Notes and explanations" of generic and specific characters.

MIOCENE.

	Page.
Columnaria? sexradiata, Lonsdale = *Septastrea (?) sexradiata*, (Lonsd.) Meek	25
Lithodendron lineata, Conrad = *Cladocora [?] lineata*, (Con.) Meek	25
Orbicula lugubris, Conrad = *Discina lugubris*, (Con.) Meek	25
Orbicula multilineata, Conrad = *Discina multilineata*, (Con.) Meek	25
Terebratula nitens, Conrad = *Rhynchonella nitens*, (Con.) Meek	25
Hinnites giganteus, Gray = *Hinnites crassis*, Conrad	26
Janira affinis, Tuomey & Holmes = *Pecten affinis*, (T. & H.) Meek	26
Janira bella, Conrad = *Pecten bella*, (Con.) Meek	26
Amussium propatulum = *Pecten propatulus*, Conrad	26
Nucula impressa, Conrad = *Yoldia impressa*, (Con.) Meek	27
Leda willamettensis, Shumard = *Nuculana willamettensis*, (Shum.) Meek	27
Nucula penita, Conrad = *Nuculana penita*, (Con.) Meek	27
Leda oregona, Shumard = *Nuculana oregona*, (Shum.) Meek	

	Page.
Nucula divaricata, Conrad = *Nucula (Acila) Conradi*, Meek	21
Pectunculus nitens, Conrad = *Limopsis nitens*, (Con.) Meek	27-28
Arca canalis, Conrad = *Anadara? canalis*, (Con.) Meek	28
Arca congesta, Conrad = *Anadara? congesta*, (Con.) Meek	28
Arca incile, Say = *Anadara incile*, (Say) Meek	28
Arca microdonta, Conrad = *Anadara microdonta*, (Con.) Meek	28
Anomalocardia trigintinaria, Conrad = *Anadara trigintinaria*, (Con.) Meek	28
Arca protracta, H. D. & W. B. Rogers = *Anadara protracta*, (Rogers) Meek	28
Arca trilineata, Conrad = *Anadara trilineata*, (Con.) Meek	28
Avicula multangula, H. C. Lea = *Pteria [?] multangula*, (H. C. Lea) Meek	28
Perna montana, Conrad = *Melina montana*, (Con.) Meek	28
Perna t[e]rta, Say = *Melina torta*, (Say) Meek	28
Modiola contracta, Conrad = *Volsella contracta*, (Conrad) Meek)	28
Modiola spiniger, H. C. Lea = *Volsella [?] spinigera*, (H. C. Lea) Meek	28
Modiola ducatelli, Conrad = *Volsella ducatelli*, (Conrad) Meek	28
Mytilus inflatus, Tnomey & Holmes = *Volsella inflata*, (T. & H.) Meek	28
Cardita abbreviata, Conrad = *Venericardia (Pteromeris) abbreviata*, (Con.) Meek	28
Cardita radians, Conrad = *Venericardia (Pteromeris) radians*, (Con.) Meek	29
Cardita carinata, Emmons = *Venericardia (Cardiocardites) carinata*, (Emm.) Meek	29
Cardita subtenta, Conrad = *Venericardia (Cardiocardites) sub[t]enta*, (Con.) Meek	29
Cardita monilicosta, Gabb. = *Venericardia (Cardiocardites) monilicosta*, (Gabb.) Meek.	29
Cardita occidentalis, Conrad = *Venericardia (Cardiocardites) occidentalis*, (Con.) Meek.	29
Lucina occidentalis, Conrad	29
Cyclas permacra, Conrad = *Lucina permacra*, (Con.) Meek	29
Venus bisecta, Conrad = *Thyatira? bisecta*, (Conrad) Meek	29-30
Isocardia fraterna, Say = *Glossus fraterna*, (Say) Meek	30
Isocardia markoi, Conrad = *Glossus markoi*, (Conrad) Meek	30
Cardium modestum, Conrad = (*Cardium (Cerastoderma) modestum*, Conrad	30
Venus (Trigona) tantilla, Gould = *Psephis tantilla*, (Gould) Gabb	30
Venus athleta, Conrad = *Chione, (Lirophora) athleta*, (Con.) Meek	30
Venus alveata, Conrad = *Chione (Lirophora) alveatus*, (Con.) Meek	30
Venus latilirata, Conrad = *Chione (Lirophora) latilirata*, (Con.) Meek	30
Venus angustifrons, Conrad = *Dione angustifrons*, (Con.) Meek	30
Venus brevilineata, Conrad = *Dione? brevilineata*, (Con.) Meek	30
Meretrix decisa, Conrad = *Dione decisa*, (Conrad) Meek	30
Cytherea oregonensis, Conrad = *Dione oregonensis*, (Con.) Meek	30
Meretrix tularana, Conrad = *Dione tularana*, (Con.) Meek	30
Meretrix uniomeris, Conrad = *Dione uniomeris*, (Con.) Meek	30
Cytherea vespertina, Conrad = *Dione vespertina*, (Con.) Meek	30
Solemya protexta = *Donax protexta*, Conrad	30
Glycimeris estrellanus, Conrad = *Panopœa estrellana*, (Con.) Meek	30
Solen curtus, Conrad = *Ensis curtus*, (Conrad) Meek	31
Bulla petrosa, Conrad = *Cylichna petrosa*, (Conrad) Meek	31
Tornatella elliptica, Trask = *Actæon ellipticus*, (Trask) Meek	31
Helonyx thallus, (Conrad) Meek = *Dentalium thallus*, Conrad	31
Diodora crucibuliformis, Conrad = *Cemoria crucibuliformis*, Conrad	31
Narica diegoana, Conrad = *Vanikoro diegoana*, (Con.) Meek	31
Crepidula prærupta, Conrad = *Crypta prærupta*, (Con.) Meek	31
Turbo glabra, H. C. Lea = *Viviparus glaber*, (H. C. Lea) Meek	31
Natica inezana, Conrad = *Natica inezana*, Conrad	31
Sinum scopulosum, Meek? = *Sigaretus scopulosus*, Conrad	31-32
Sycotypus ocoyanus, Conrad = *Ficus [? ?] ocoyanus*, (Conrad) Meek	32
Pyrula modesta, Conrad = *Ficus modestus*, (Conrad) Meek	32
Oliva ancillariæformis, H. C. Lea = *Olivella ancillariformis*, (H. C. Lea) Meek	32
Fusus Oregonensis, Conrad = *Busycon? Oregonensis*, (Conrad) Meek	32
Colus arctatus, Conrad = *Fusus arctatus*, (Conrad) Meek	32
Fusus migrans, Conrad = *Tritonifusus migrans*, (Con.) Meek	32
Nautilus angustatus, Conrad = ? *Aturia angustatus*, (Con.) Meek	32

47.

MEEK, F. B. Note on Bellinurus Danæ, from the Illinois Coal-measures. <Am. Journ. Sci., vol. xliii, 2d ser., pp. 257, 258. 1867. New Haven, 1867.

In this note the author expresses the opinion that Bellinurus danæ, Meek and Worthen, properly belongs to the recently proposed genus Prestwichia, Woodward.

48.

EK, F. B. Note on a new genus of fossil Crustacea. <Am. Journ. Sci., vol. xliii, 2d ser., pp. 394, 395. 1867. New Haven, 1867.

Genus Euprōops. This genus was afterward fully described and illustrated in vol. iii of Worthen's Illinois Geological Reports.

49.

EK, F. B. On the punctate shell-structure of Syringothyris. <Am. Journ. Sci., vol. xliii, 2d ser., pp. 407, 408. 1867. New Haven, 1867.

50.

EK, F. B. Remarks on Professor Geinitz's views respecting the Upper Paleozoic rocks and Fossils of Southeastern Nebraska. <Am. Journ. Sci., vol. xliv, 2d ser., pp. 170–187; continued, pp. 327–339; notes to the same pp. 282, 283. 1867. New Haven, 1867.

This is an extended discussion and criticism of Dr. Geinitz's "Carbon formation und Dyas in Nebraska." The following fossils are discussed especially:

	Page
Serpula (Spirorbis) planorbites, Münster	177
Euomphalus rugosus, Hall	177
Spirorbis helix, King	178
Murchisonia subtæniata, Geinitz	178
Orthonema subtæniata, Geinitz, sp	178
Bellerophon interlineatus, Portlock	178
Bellerophon marcouanus, Geinitz	178
Macrochellus pallianus, Geinitz	178
Allorisma elegans, King	178
Solenomya biarmica, de Verneuil	178–179
Astarte gibbosa, McCoy	179
Astarte nebrascensis, Geinitz	179
Astarte mortonensis, Geinitz	179
Astarte vallisneriana, King	179
Schizodus obscurus, Sowerby	179
Schizodus rossicus, de Verneuil	179
Arca striata, Schlotheim	179–180
Macrodon tenuistriata, M. & W	179–180
Nucula kazanensis, de Verneuil	180
Leda bellistriata, Stevens	180
Nucula beyrichi, Schlotheim	180
Clidophorus pallasi, M. V. & King	180–181
Clidophorus (Pleurophorus) simplus, Keyserling	181
Pleurophorus subcuneatus, M. & H	181
Clidophorus solenoides, Geinitz	181
Aucella Hausmanni (Goldf.), Geinitz	182
Myalina swallovi, McChesney	182
Mytilus concavus? (Swallow), Geinitz	182
Myalina perattenuata (M. & H.), Geinitz	182
Myalina subquadrata (Shumard), Geinitz	182
Avicula speluncaria (Schlotheim), Geinitz	182
Monotis hawni, M. & H	182
Pseudomonotis hawni, M. & H	182
Pseudomonotis sinuata	183
Avicula pinnæformis, Geinitz	183
Gervillia parva (M. & H.), Geinitz	182–183
Gervillia longa, Geinitz	183
Gervillia (avicula) sulcata, Geinitz	183
Pecten neglectus, Geinitz	183
Pecten Missouriensis? (Shumard), Geinitz	183
Pecten hawni, Geinitz	183
Pecten broadheadii, Swallow	183
Aviculopecten hawni	183

	Page.
Rhynchonella angulata, (Linnæus), Geinitz	183
Camarophoria globulina, (Phillips), Geinitz	183
Rhynchonella uta, Marcou	183
Retzia mormonii (Marcou sp.), Geinitz	184
Athyris subtilita, Hall	184
Spirifer moosakpaliensis, Davidson	184
Spirifer cameratus (Morton), Geinitz	184
Spirifer laminosus (McCoy), Geinitz	184
Spiriferina kentuckensis, Shumard	184
Orthisina missouriana, Swallow	185
Plicatula striato-costata, Cox	185
Productus horrescens	185
Productus rogersii	185
Productus nebrascensis, Owen	185
Productus flemingii	185
Productus prattenianus, Norwood	185
Productus koninckianus (de Verneuil), Geinitz	185
Productus cancrini (de Verneuil), Geinitz	186
Productus orbignianus (de Koninck), Geinitz	186
Productus longispinus, Sowerby	186
Productus horridus (Sowerby), Geinitz	186
Chonetes mucronata (M. & W.), Geinitz	186
Chonetes glabra, Geinitz	186
Cyathocrinus ramosus (Schlotheim), Geinitz	186
Cyathocrinus inflexus, Geinitz	186
Poteriocrinus hemisphericus, Shumard	186
Eucidaris hallianus, Geinitz	187
Polypora marginata (McCoy), Geinitz	187
Polypora biarmica (Keyserling), Geinitz	187
Synocladia virgulacea (Phillips), Geinitz	187
Aviculopinna pinnæformis	282
Aviculopinna Americana, n. s., Meek, 1867	283
Cyathaxonia	328
Allorisma elegans, King	328
Schizodus rossicus, de Verneuil	328
Ausella hausmanni, Goldf	329
Spirifer laminosus, McCoy	329
Lima retifera, Shumard	329
Stenophora columnaris, Schlot., sp	329–330
Synocladia virgulacea, Geinitz, not Phillips	330
Synocladia biserialis, Swallow	330

51.

MEEK, F. B. Note on the genus Palæacis, Haime, 1860 (=Sphenopoterium, M. & W., 1866.) <Am. Journ. Sci., vol. xliv, 2d ser., pp. 419, 420. 1867. New Haven, 1867.

The author here takes the view that Sphenopoterium, originally published in the Illinois Geol. Reports, is identical with Palæacis.

	Page.
Palæacis obtusa, M. & W	419–420
Palæacis umbonata, Seebach	420
Palæacis cymbia, Seebach	420

52.

MEEK, F. B. Fossils from the west coast of Kennedy Channel. <Hayes's "Open Polar Ocean," London, 1867, p. 341.

Describes various fossils collected by Dr. Hayes on the west coast of Kennedy's Channel, from deposits of lower Helderberg age. *Zaphrentis hayesii* and *Loxonema ? kanei* are described as new species. A preliminary notice appeared in Am. Journ. Sci. and Arts, ser. 2, vol. xl, pp. 31–34. New Haven, 1865.

For list of species see entry number 33, p. 36.

53.

MEEK, F. B. Preliminary notice of a remarkable new genus of corals, probably typical of a new family; forwarded for study by Prof. J. D. Whitney, from the Silurian rocks of Nevada Territory. <Am. Journ. Sci., vol. xlv, 2d ser., pp. 62–64. 1868. New Haven.

	Page.
Ethmophyllum, n. g., Meek, 1868	62–64
Ethmophyllum whitneyi, n. s., Meek, 1868	64
Ethmophyllum gracile, n. s., ? Meek, 1868	64

54.

MEEK, F. B. Note on the shell-structure and family affinities of the genus Aviculopecten. <Am. Journ. Sci., vol. xlv, 2d ser., pp. 64, 65. 1868. New Haven, 1868.

The author shows that by the shell-structure the Aviculopectens are allied to Avicula rather than to Pecten.

55.

MEEK, F. B., *and* WORTHEN, A. H. Preliminary notice of a Scorpion, a Eurypterus ? and other fossils, from the Coal-measures of Illinois. <Am. Jour. Sci., vol. xlvi, 2d ser., pp. 19–28. 1868. New Haven, 1868.

Afterward fully described and illustrated in one of the Illinois Geological Reports, vol. iii.

	Page.
Eurypterus (*Anthraconectes*) *mazonensis*, n. s., M. & W., 1868	19–21
Adelopthalmus mazonensis ?	22
Ceratiocaris ? *sinuatus*, n. s., M. & W., 1868	22
Buthus ?? *carbonarius*, n. s., M. & W., 1868	22–24
Scorpio carbonarius, n. s., M. & W., 1868	22–24
Eoscorpius, n. g. ? M. & W., 1868	24–25
Euphoberia, n. g., M. & W., 1868	25–26
Euphoberia armigera, n. s., M. & W., 1868	26
Euphoberia major, n. s., M. & W., 1868	26
Acanthotelson	27–28
Acanthotelson eveni, n. s., M. & W., 1868	28
Palæocaris	28
Gampsonyx	28
Anthracerpes	28

56.

MEEK, F. B. Note on Ethmophyllum and Archeocyathus. <Am. Journ. Sci., vol. xlvi, 2d ser., p. 144. 1868. New Haven, 1868.

The author abandons his formerly proposed genus Ethmophyllum, believing it to be identical with Archeocyathus of Billings.

57.

MEEK, F. B., *and* WORTHEN, A. H. Notes on some points in the Structure and Habits of the Paleozoic Crinoidea. <Proc. Acad. Nat. Sci. Phila., vol. xx, pp. 323–334. 1868. Philadelphia, 1868.

Afterward republished in the Illinois Geological Reports, vol. v, and in Amer. Jour. Sci. and Canad. Nat. See entries Nos. 61 and 64.

	Page.
Synbathocrinus, Phillips	323
Goniasteroidocrinus, Lyon & Casseday	323–324
Cyathocrinus, Miller	324–325
Convoluted support of the digestive sack, in the *Actinocrinidæ*	325–327
Ambulacral canals passing under the vault of the *Actinocrinidæ*	327–334

Cyathocrinites tenuidactylus, n. s., M. & W., 1868.....
Barycrinus,* n. g., Wachsmuth MS.....
Barycrinus magnificus, n. s., M. & W., 1868.....
Barycrinus hoveyi var. *herculeus*, M. & W., 1868.....
Nyctocrinus,† n. g., Wachsmuth, MS.....
Nyctocrinus wachsmuthi, n. s., M. & W., 1868.....
Catillocrinus, Troost.....
Catillocrinus bradleyi, n. s., M. & W., 1868.....
Dichocrinus, Munster.....
Dichocrinus expansus, n. s., M. & W., 1868.....
Dorycrinus, Roemer.....
Dorycrinus roemeri, n. s., M. & W., 1868.....
Dorycrinus quinquelobus, var. *intermedius*, M. & W., 1866.....
Amphorocrinus, Austin.....
Amphorocrinus divergens, Hall, sp., 1860.....
Batocrinus, Casseday.....
Subgenus *Eretmocrinus*, Lyon & Casseday.....
Subgenus *Alloprosallocrinus*, Casseday & Lyon.....
Batocrinus gracilus, n. s., M. & W., 1868.....
Batocrinus casseday anus, n. s., M. & W., 1868.....
Batocrinus trochiscus, n. s., M. & W., 1868.....
Batocrinus (*Eretmocrinus*) *neglectus*, n. s., M. & W., 1868.....
Pentremites, Say.....
Pentremites (*Troostocrinus?*) *woodmani*, n. s., M. & W., 1868.....
Agelacrinites Vanuxem.....
Agelacrinites (*Lepidoliscus*) *squamosus*, n. s., M. & W., 1868.....
Echinoidea.....
Oligoporus, M. & W.....
Oligoporus nobilis, n. s., M. & W., 1868.....

59.

MEEK, F. B., *and* WORTHEN, A. H. Paleontology. <Geological Sur
vol. iii, pp. 291–565, plates 1–20. 1868. Springfield, 1868.

Published by authority of the legislature of Illinois, 1868.
Silurian, Devonian, and Carboniferous.

LOWER SILURIAN SPECIES.

TRENTON GROUP.

Radiata.....

	Page.
Cephalopoda	298
Orthoceras, Auct	298
O. (Ormoceras) backii, Stokes? 1837, pl. i, fig. 4	298–299
Articulata:	
Crustacea	299
Lichas, Dalman, 1827	299
L. cucullus, M. & W, 1865	299–300

FOSSILS OF THE GALENA BEDS.

Protozoa	301
Receptaculites, Defrance, 1827	301
R. globularis, Hall, 1861, pl. ii, figs. 2 *a*, *b*	301
R. ——? pl. ii, figs. 1 *a*, b	301–302
R. owenî, Hall, 1861, pl. ii, fig. 3	302–303
Radiata	304
Zoophyta	304
? Chætetes, Fischer, 1837	304
C. petropolitanus, Pander? sp., 1830, pl. ii, figs. 8 *a*, *b*	304–305
Mollusca	305
Brachiopoda	305
Lingula, Brugiere, 1792	305
L. quadrata, Eichwald, 1829, pl. ii, fig. 4 *a–c*	305–306
Lamellibranchiata	306
Ambonychia, Hall, 1847	306
A. intermedia, n. s., M. & W., 1868, pl. ii, figs. 5 *a*, *b*	306–307
Tellinomya, Hall, 1847 (not *Tellinya*, Brown, 1827=*Tellinomya*, Agassiz, 1846)	307
T. ventricosa, Hall, 1861, pl. ii, figs. 7 *a*, *b*, *c*	307–308
T. alta, Hall, 1861, pl. ii, figs. 6 *a*, *b*	309
Cypricardites, Conrad, 1841	309–310
C. ——? pl. iii, figs. 9 *a*, *b*, *c*, *d*	311
C. obliquus, n. s., M. & W., 1868, pl. ii, figs. 9 *a*, *b*	311–312
Gasteropoda	312
Bellerophon, Montfort, 1808	312
B. (Bucania?) platystoma, n. s., M. & W., 1868, pl. iii, figs. 8 *a*, *b*	312–313
Ophileta, Vanuxem, 1842	313
O. owenana, n. s., M. & W., 1868, pl. iii, figs. 6 *a*, *b*	313–314
Trochonema, Salter, 1857	314
T. umbilicata, Hall? sp., 1847, pl. iii, figs. 5 *a*, *b*	314–315
Raphistoma, Hall, 1847	316
R. lenticularis, Conrad, sp., 1842, pl. iii, figs. 7 *b*, (*a*, *c*?)	316–317
Murchisonia, d'Archiac & d'Verneuil, 1841	317
M. bicincta, Hall? 1847, pl. iii, fig. 4	317–318
Cephalopoda	318
Orthoceras, Auct	318
O. anellum, Conrad, 1843, pl. iii, fig. 3	318–320
Articulata	320
Crustacea	320
Illænus, Dalman, 1826	320
I., taurus, Hall, 1861, pl. iii, fig. 2	320–322
I. crassicauda, Wahlenb.?? 1821, pl. iii, figs. 1 *a*, *b*	322–323

FOSSILS OF THE CINCINNATI GROUP.

Radiata	324
Echinodermata	324
Crinoidea	324
Heterocrinus, Hall, 1847	324
H. crassus, M. & W., 1865, pl. iv, figs. 1 *a*, *b*, *c*	324–325
H. subcrassus, M. & W., 1865, pl. iv, figs. 5 *a–d*	325–326
Hybocrinus, Billings, 1866	327
Subgenus *Anomalocrinus*, M. & W	328
Hybocrinus? incurvus, M. & W., 1865, pl. iv, fig. 3 *a*, *b*, and p. 327, fig. —	327–329
Porocrinus, Billings, 1856	329–330
P. crassus, M. & W., 1865, p. 330, fig *a*, *b*, and pl. iv, figs. 2 *a*, *b*	330–332
P. pentagonius, M. & W., 1865, pl. i, fig. 3	332–333
Dendrocrinus, Hall, 1852	333
D. ornegöensis, n. s., M. & W., 1868, p. 333, fig. —, and pl. iv, fig. 4	333–334

Page.

Mollusca 335
Brachiopoda 335
Strophomena, Rafinesque, 1820? 335
S. unicostata, n. s., M. & W., 1868, pl. iv, figs. 11 *a*, *b* 335-337
Lamellibranchiata 337
Ambonychia, Hall, 1847 337
Subgenus *Megaptera*, M. & W., 1866 337
Megaptera casei, M. & W., 1866, pl. iv, figs. 9 *a*, *b* 337-338
Dolabra, McCoy, 1844 338
D. sterlingensis, M. & W., 1866, pl. iv, figs. 10 *a*, *b*, *c* 338-340
Gasteropoda 340
Cyrtolites, Conrad, 1838 340
C. imbricatus, n. s., M. & W., 1868, pl. iv, fig. 12 340-341
Pteropoda 341
Tentaculites, Schlotheim, 1820 341
T. tenuistriatus, M. & W., 1865, pl. iv, figs. 7 *a*, *b* 341-342
T. oswegoensis, M. & W., 1865, pl. iv, fig. 6 *a* 342-343
T. sterlingensis, M. & W., 1865, pl. iv, fig. 8 343

UPPER SILURIAN SPECIES.

FOSSILS OF THE NIAGARA GROUP.

Protozoa 344
Spongiæ 344
Astylospongia, Roemer 344
A.? christiani, n. s., M. & W., 1868, pl. v, figs. 3 *a*, *b*, *c* 344-345
Pascolus, Billings, 1858 345
P.? dactylicides, Owen, sp., 1844, pl. v, figs. 2 *a*, *b*, *c* 345-346
Radiata 347
Echinodermata 347
Saccocrinus, Hall, 1852 347
S. christyi, Hall? sp., 1863, pl. v, fig. 1 347-349
Mollusca 349
Brachiopoda 349
Hemipronites, Pander, 1830 349
H. subplanus, Conrad? sp., 1842, pl. vi, figs. 6 *a*, *b* 349-351
Obolus, Eichwald, 1829 351
O. [*Trimerella?*] *conradi*, Hall, 1868, pl. v, figs. 7 *a*, *b* 351-352
Centronella, Billings, 1859 352
C. billingsiana, n. s., M. & W., 1868, p. 352, figs. *a–c*, and pl. vi, figs. 5 *a–c* 352-353
Meristella, Hall, 1860 353
Meristella? sp., pl. vi, figs. 4 *a*, *b* 353

Page.
Edriocrinus, Hall, 1859 ... 370
E. pocilliformis, Hall, 1859, pl. vii, figs. 5 *a*, *b* ... 370–371
Mollusca ... 371
Brachiopoda ... 371
Orthis, Dalman, 1828 ... 371
O. hybrida, Sowerby ? 1839, pl. vii, figs. 7 *a–d* ... 371–372
O. subcarinata, Hall, 1857, pl. vii, figs. 6 *a–d* ... 373–374
Strophomena, Rafinesque, 1820 ... 374
S. (*Strophodonta*) *cavumbona*, Hall ? 1857, pl. vii, fig. 10 *a*, *b* ... 374–376
Merista, Suess, 1851 ... 376
M. lævis, Vanuxem ? sp., 1843, pl. vii, figs. 8 *a*, *c* ... 376–377
Zygospira, Hall, 1862 ... 377–380
Z. subconcava, n. s., M. & W., 1868, pl. vii, fig. 1 *a–d* ... 380–381
Trematospira, Hall, 1859 ... 381
T. ? imbricata, Hall, 1857, pl. vii, fig. 2 *a–e* ... 381–382
Cyrtina, Davidson, 1858 ... 383
C. dalmani, Hall, sp., 1857, pl. vii, figs. 3 *a*, *b* ... 383
Spirifer, Sowerby, 1815 ... 384
Subgenus *Trigonotreta*, Kœnig, 1825 ... 384
S. perlamellosus, Hall, 1857, pl. vii, figs. 9 *a*, *b* ... 384
Gasteropoda ... 384
Platyceras, Conrad, 1840 ... 384–387
P. subundatum, n. s., M. & W., 1868, pl. vii, figs. 13 *a*, *b*, and 14 *a*, *b* ... 387–388
P. spirale, Hall, 1859, pl. vii, fig 12 *a–c* ... 389
P. (*Orthonychia*) *pyramidatum*, Hall ? 1859, pl. vii, fig. 11 ... 389–390
Articulata ... 390
Crustacea ... 390
Acidaspis, Murchison, 1839 ... 390
Acidaspis hamata, Conrad, sp., 1841, pl. vii, fig. 15 ... 390–391
Dalmanites, Auct. ... 391
D. tridentifera, Shumard, 1855, pl. vii, fig. 16 ... 391–392

DEVONIAN SPECIES.

FOSSILS OF THE ORISKANY GROUP.

Mollusca ... 393
Brachiopoda ... 393
Leptæna, Dalman, 1827 ... 393
L. ? nucleata, Hall, 1859, pl. viii, figs. 8 *a–d* ... 393–394
Rhynchonella, Fischer, 1809 ... 394
R. speciosa, Hall, 1857, pl. viii. fig. 9 ... 394–395
Eatonia, Hall, 1857 ... 395
E. peculiaris, Conrad, sp., 1841, pl. viii, figs. 2 *a–d* ... 395–396
Leptocælia, Hall, 1857 ... 397
L. flabellites, Conrad, sp., 1841, pl, viii, figs. 3 *a–c* ... 397–398
Spirifer, Sowerby, 1815 ... 398
Subgenus *Trigonotreta*, Kœnig, 1825 ... 398
S. engelmanni, n. s., M. & W., 1868, pl. viii, figs. 5 *a–d* ... 398–399
S. hemicyclus, n. s., M. & W., 1868, pl. viii, figs. 6 *a–d*, and 7 *a*, *b* ? ... 399–401
Rensselæria, Hall, 1859 ... 401
R. condoni, McChesney, 1861, pl. viii, figs. 4 *a*, *b* ... 401–402
Stricklandinia, Billings, 1863 ... 402
S. elongata var. *curta*, M. & W., 1868, pl. viii, figs. 1 *a–c*, and pl. ix, fig. 5 ? ... 402–404
Gasteropoda ... 404
Strophostylus, Hall, 1859 ... 404
S. cancellatus, n. s., M. & W., 1868, p. 404, figs. and pl. viii, fig. 12 (11 *a*, *b ?*) ... 404–405
Platyceras, Conrad, 1840 ... 406
P. spirale, Hall ? 1859, pl. viii, fig. 10 ... 406

FOSSILS OF THE CORNIFEROUS GROUP.

Radiata ... 407
Zoophyta ... 407
Pleurodictyum, Goldfuss, 1829 ... 407
P. problematicum, Goldf. ? 1859, pl. ix, figs. 1 *a–c* ... 407–409
Baryphyllum, E. & H., 1850 ... 409

P

B.?? arenarium, n. s., M. & W., 1868, pl. ix, figs. 2 *a*, *b* 40
Zaphrentis, R. & C., 1820.....
Zaphrentis, sp. undt., pl. ix, fig. 3 *a*, *b* .....
Molluscа .....
Brachiopoda .....
Orthis, Dalman, 1828 .....
Orthis, undt., pl. ix, fig. 4 41
Strophomena, Raf., 1820 .....
S. (*Strophodonta*), sp.? pl. ix, figs. 9 (and 7 *a*?) 41
S. (*Strophodonta*), sp., pl. vi, figs. 6 *a*, *b* .....
Productus, Sowerby, 1814 .....
P. exanthematus, Hall?? 1857, pl. x, figs. 3 *a–c* 41
Spirifer, Sowerby, 1815.....
Subgenus *Trigonotreta*, Kœnig, 1825 .....
S. perextensus, n. s., M. & W., 1868, pl. x, figs. 1 *a–d* 41
S. paradoxus, Schlot.?? sp., 1813, pl. x, fig. 2..... 41
Articulata.....
Crustacea .....
Dalmanites, Auct.....
Subgenus *Odontocephalus*, Conrad, 1840.....
Odontocephalus ——? pl. ix, fig. 10..... 41
Dalmanites (*Odontocephalus*) *ægeria*, Hall? sp., 1861, pl. x, figs. 4 *a–c* 41

FOSSILS OF THE HAMILTON GROUP.

Protozoa .....
Spongiæ .....
Astræospongia, Rœmer, 1854 .....
A. hamiltonensis, M. & W., 1866, pl. x, fig. 6.....
Radiata .....
Zoophyta .....
Microcyclus,* n. g., M. & W., 1866.....
M. discus, n. s., M. & W., 1868, pl. xi, figs. 7 *a*, *b* 42
Echinodermata .....
Taxocrinus, Phillips, 1843 .....
T. gracilis, M. & W., 1865, page 421, fig. —, and pl. xiii, fig. 3 421
Mollusca .....
Brachiopoda .....
Orthis, Dalman, 1827 .....
O. mcfarlani, Meek, 1868, pl. xiii, figs. 10 *a–d*..... 42
O. iowensis var. *furnarius*, Hall, pl. xiii, figs. 9 *a*, *b* 42
Strophomena, Raf., 1820.....
S. rhomboidalis, Wahlemb., sp., 1821, pl. x, fig. 7 *a*, *b* 42
Tropidoleptus, Hall, 1857.....
T. carinatus, Conrad, sp., 1839, pl. xiii, figs. 2 *a–c* 42
Pentamerus, Sowerby, 1813 .....
P. comis, Owen? sp., 1855, pl. xiii, figs. 6 *a–c*..... 42
P. subglobosus, n. s., M. & W., 1868, pl. xiii, figs. 5 *a–c*..... 42
Atrypa, Dalman, 1827.....
A. aspera, Schlotheim, sp., 1813, pl. xiii, figs. 7 *a–d*..... 43
A. reticularis, Linnæus, sp., 1767, pl. xiii, fig. 11 43
Spirifer, Sowerby, 1815 .....
Subgenus *Trigonotreta*, Kœnig, 1825 .....
S. fornacula, Hall, 1857, pl. xiii, figs. 8 *a–c*. 43
S. subundiferus, n. s., M. & W., 1868, pl. x, fig. 5 *a–c*..... 43
Cyrtina, Davidson, 1858 .....
C. triquetra, Hall, sp., 1858, pl. xiii, fig. 4 *a–d* .....
Lingula, Bruguiere, 1792.....
L. subspatulata, n. s., M. & W., 1868, pl. xiii, fig. 1 .....
Lamellibranchiata .....
Pterinea, Goldf., 1832 .....
P.? subpapyracea, M. & W., 1866, pl. xi, fig. 5 43
Modiolopsis, Hall, 1847 .....
M.? perovata, M. & W., 1865, pl. xi, fig. 2..... 43

*μικρος, small; κυκλος, a circle.

	Page.
Grammysia, de Verneuil, 1847	439
G.? rhomboidalis, M. & W., 1865, pl. xi, figs. 5 *a*, *b*	439–441
Gasteropoda	441
Platyceras, Conrad, 1840	441
P. ventricosum, Conrad, 1840, pl. xi, figs. 4 *a*, *b*	441–442
Isonema,* M. & W., 1865	442–443
I. depressa, M. & W., 1865, p. 443, figs. A, B, and pl. xi, figs. 6 *a*, *b*	443
Cephalopoda	444
Gomphoceras, Sowerby, 1839	444
G. turbiniforme, M. & W., 1866, pl. xii, figs. 2 *a*, *b*	444
Cyrtoceras, Goldf. 1832	445
C. sacculum, M. & W., 1866, pl. xii, figs. 3 *a–c*	445–446
Gyroceras, de Koninck, 1844	446
G. constrictum, n. s., M. & W., 1866, pl. xii, figs. 1 *a*, *b*	446–447
Articulata	447
Crustacea	447
Phacops, Emmerich, 1839	447
P. rana, Green, sp., 1832. pl. xi, figs. 1 *a–e*	447–449

CARBONIFEROUS SPECIES.

FOSSILS OF THE KINDERHOOK GROUP.

Mollusca	450
Brachiopoda	450
Rhynchonella, Fisher, 1809	450
R. missouriensis, Shumard, 1855, pl. xiv, figs. 7 *a–d*	450–452
Lamellibranchiata	453
Pernopecten, Winchell, 1865	453
P. shumardianus, Winchell, 1865, pl. xiv, figs. 6 *a*, *b*	453–455
Pterinea, Goldf., 1832	456
P. undulata, n. s., M. & W., 1868, pl. xiv, fig. 5	456
Gasteropoda	457
Platyceras, Conrad, 1840	457
P. (Orthonychia?) subplicatum, M. & W., 1866, pl. 14, figs. 4 *a–c*	457
P. haliotoides, M. & W., 1866, pl. xiv, figs. 3 *a*, *b*	458
Porcellia, Leveille, 1835	458
P. nodosa, Hall, 1860, pl. xiv, figs. 1 *a*, *b*	458–459
Gyroceras, de Koninck, 1844	459
G. rockfordensis, M. & W., 1866, pl. xiv, fig. 2 *a*	459–460
Articulata	460
Crustacea	460
Proetus, Steininger, 1830?	460
P. elliptious, M. & W., 1865, pl. xiv, fig. 8	460–462

FOSSILS OF THE BURLINGTON GROUP.

Radiata	463
Echinodermata	463
Belemnocrinus, White, 1862	463
B. whitii, M. & W., 1866, p. 463, fig. —, and pl. xviii, fig. 4 *a–c*	463–464
Catillocrinus, Troost, 1850	465
C. wachsmuthi, M. & W., 1866, pl. xviii, fig. 5	465–466
Platycrinus, Miller, 1821	466
P. scobina, M. & W., 1861, p. 466, fig. —, and pl. xvi, fig. 9	466–467
P. planus, Owen & Shumard? 1850, pl. xvi, fig. 6	467–468
P. (Pleurocrinus) asper, M. & W., 1861, p. 468, fig. —, and pl. xviii, fig. 9	468–469
Actinocrinus, Miller, 1821	470
A. (Saccocrinus?) amplus, M. & W., 1861, p. 470, fig. —, and pl. xvi, fig. 2	470–472
A. (Batocrinus) pistillus, M. & W., 1865, pl. xvi, figs. 4 *a*, *b*	472–474
Steganocrinus, M. & W., 1866	474
S. pentagonus, Hall, sp., 1858, pl. xvi, fig. 8	474–476
Rhodocrinus, Miller, 1821	476
R. nanus, M. & W., 1866, p. 476, figs. —, and pl. xviii, figs. 2 *a*, *b*	476–478
Bursacrinus,† M. & W., 1861	478
B. wachsmuthi, M. & W., 1861, pl. xvii, fig. 6, and p. 479, fig. —	479–480

*ισος, equal; νημα, a thread. †βυρσα, a purse; χρινον, a lily.

Page

Cyathocrinus, Miller, 1821 4
C. enormis, M. & W., 1865, pl. xvi, figs. 3 *a*, *b* 481-4
C. wachsmuthi, M. & W., 1861, p. 482, fig. —, and pl. xvi, fig. 5 482-4
Poteriocrinus, Miller, 1821 4
P. tenuibrachiatus, M. & W., 1861, p. 484, fig. —, and pl. xvi, fig. 1 484-4
P. subimpressus, M. & W., 1861, p. 485, fig. —, and pl. xviii, figs. 1 *a*, *b* 485-4
P. carinatus, M. & W., 1861, p. 486, fig. —, and pl. xvii, fig. 1 486-4
Subgenus *Scaphiocrinus*, Hall, 1858 4
S. wachsmuthi, M. & W., 1861, p. 488, fig. —, and pl. xvi, figs. 7 *a*, *b* 488-4
Poteriocrinus (*Scaphiocrinus*) *tenuidactylus*, M. & W., 1865, p. 490, fig. —, and pl. xviii, fig. 10 490-4
Onychocrinus, Lyon & Casseday, 1859 4
O. diversus, M. & W., 1866, page 492, fig. —, and pl. xvii, figs. 5 *a*, *b* 492-4
Tazocrinus, Phillips, 1843 4
Forbesiocrinus, de Kon. & Le Hon, 1854 4
F. agassizi, var. *giganteus*, M. & W., 1861, pl. xviii, fig. 3 4
Granatocrinus (Troost), Hall, 1852 4
G. projectus, M. & W., sp., 1861, page 496, fig. —, and pl. xviii, fig. 7 4
G. norwoodi, O. & S. ? sp., 1860, pl. xviii, fig. 8 496-
G. shumardi, M. & W., 1866, page 498, fig. —, and pl. xviii, figs. 6 *a*, ? *b* 498-
Asteroidea .....
Schœnaster, M. & W., 1860 .....
S. wachsmuthi, M. & W., 1866, pl. xvii, fig. 4 499-
Mollusca .....
Polyzoa .....
Evactinopora, M. & W., 1865 .....
E. radiata, M. & W., 1865, page 502, fig. —, and pl. xvii, figs. 2 *a*, *b* .....
E. sexradiata, n. s., M. & W., 1868, pl. xvii, fig. 3 .....
E. grandis, n. s., M. & W., 1868, p. 503, fig. —, and pl. xv, figs. 2 *a*, *b* .....
Fenestella, Lonsdale, 1839 .....
Subgenus *Lyropora*, Hall, 1856 .....
Fenestella (*Lyropora*) *retrorsa*, n. s., M. & W., 1868, pl. xv, fig. 1 .....
Brachiopoda .....
Chonetes, Fischer, 1837 .....
C. illinoisensis, Worthen, 1860, pl. xv, figs. 8 *a*, *b* 505
Gasteropoda .....
Metoptoma, Phillips, 1836 .....
M.? umbella, M. & W., 1866, pl. xv, figs. 6 *a*, *b*, *c*; and 7 506-
Platyceras, Conrad, 1840 .....
P. [*?*] *reversum*, Hall, 1860, p. 508, fig. —, and pl. xv, figs. 4 *a*, *b* 508-

	Page.
Asteroidea	526
Onychaster,* n. g., M. & W., 1868	526
O. flexilis, n. s., M. & W., 1868, p. 526, figs. A, B, C, D	526–528
Mollusca	528
Brachiopoda	528
Productus, Sowerby, 1814	528
P. magnus. M. & W., 1861, pl. xx, figs. 7 *a–c*	528–530
Spirifer, Sowerby, 1815	530
S. propinquus, Hall, 1858, pl. xix, figs. 8 *a–c*	530–532
Lamellibranchiata	532
Aviculopecten, McCoy, 1851	532
A. indianensis, M. & W., 1866, pl. xix, figs. 6*a*, *b*	532–534
Anthracoptera, Salter, 1862	534
A.? fragilis, M. & W., 1866, pl. xix, fig. 4	534–535
Pleurophorus, King, 1844	535
P. costatiformis M. & W., 1865, p. 535, fig. —, and pl. xix, fig. 8†	535–536
Lithophaga, Lamarck. 1812	536
L. lingualis, Phillips?, sp., 1836, pl. xix, figs. 1, 2	536–537
Sedgwickia, McCoy, 1844	537
S. (Sanguinolites) subarcuata, M. & W., 1865, pl. xix, fig. 3 *b* (not 3 *a*)	537–538
Allorisma, King, 1844	538
A. (Chænomya?) hybrida, M. & W., 1865, pl. xix, fig. 3 *a* (not 3 *b*)	538–539

ARTICULATE FOSSILS OF THE COAL MEASURES.

Crustacea	540
Entomostraca	540
Gnathostomata	540
Phyllopoda	540
Ceratiocaris, McCoy, 1849	540
C.? sinuatus, M. & W., 1868, p. 540, fig. A	540–541
Leaia, Jones, 1862	541
L. tricarinata, n. s. M. & W., 1868, woodcut, figs. B 1, 2, 3 (and C?), p. 540	541–543
Merostomata	544
Eurypteridæ	544
Eurypterus, De Kay, 1825	544
E. (Anthraconectes) mazonensis, M. & W., 1868, figs.—, p. 544	544
Ziphosura	547
Euproops, Meek, 1867	547
E. danæ, M. & W., 1865, p. 547, figs. A, B	547–549
Tetradecapoda	549
Isopoda	549
?Acanthotelson, M. & W., 1860	549
A. stimpsoni, M. & W., 1860, p. 549, figs. A, B	549–550
A. eveni, M. & W., 1868, p. 551, figs. A, B, C, D	551
Decapoda	552
Macrura	552
Palæocaris, M. & W., 1865	552
P. typus, M. & W., 1865, p. 552, figs. A, B	552–553
Gampsonix fimbriatus, p. 552, figs. C, D	552
Anthrapalæmon, Salter, 1861	554
A. gracilis, M. & W., 1865, p. 554, figs. A, B	554–555
Myriapoda	556
Euphoberia, M. & W., 1868	556
E. armigera, M. & W., 1865, p. 556, figs. A, B, C, D	556–558
E.? major, M. & W., 1868, p. 558, fig. —	558–559
Arachnida	560
Pulmonaria	560
Eoscorpius, M. & W., 1868	560
E. carbonarius, M. & W., 1868, p. 560, figs. *a*, *c*, *d*, *m*, *p*	560–562
Mazonia,† n. g. M. & W., 1868	563
M. woodiana, M. & W., 1868, p. 563, figs. A, B, C, D	563–565
Note on the genus *Palæocampa*	565

*ονυξ, a claw; αστηρ, a star. † Mason, name of stream.

60.

MEEK, F. B. Remarks on the geology of the valley of Mackenzie River, with figures and descriptions of fossils from that region, in the Museum of the Smithsonian Institution, chiefly collected by the late Robert Kennicott, Esq. <Trans. Chicago Acad. of Sci., vol. i, pp. 61–114, plates xi, xv. 1868. Chicago, 1867–1869.

Devonian.

CORALS.

	Page.
Cyathophyllidæ.	
Cyathophyllum, Goldfuss, 1826	79
C. articum, n. s., Meek, 1868, pl. xi, fig. 8	79–80
Cystophyllum, Lonsdale, 1839	80
C. americanum var. *articum*, Meek, pl. xi, fig. 6	80–81
Aulophyllum, Edwards & Haime, 1850	81
A.? richardsoni, n. s., Meek, 1868, pl. xi, fig. 3	81–82
Zaphrentis, Rafinesque, 1820	82
Z. recta, n. s., Meek, 1868, pl. xi, fig. 1	82
Z. mcfarlanei, n. s., Meek, 1868, pl. xi, fig. 2	83
Smithia, Edwards & Haime, 1851	83
S. verrilli, n. s., Meek, 1868, pl. xi, fig. 7	83–84
Combophyllum, Edwards & Haime, 1858	84
C. multiradiatum, n. s., Meek, 1868, pl. xi, fig. 4	84–85
Fungidæ.	
Palæocyclus, Edwards & Haime, 1849	85
P. kirbyi, n. s., Meek, 1868, pl. xi, fig. 5	85
Favositidæ.	
Favosites, Lamarck, 1816	86
F. polymorpha, Goldfuss, sp., pl. xi, fig. 10	86
Alveolites, Lamarck, 1801	86
A. vallorum, n. s., Meek, 1868, pl. xi, fig. 9	86–87
Brachiopoda.	
Lingulidæ.	
Lingula, Bruguière	87
L. minuta, n. s., Meek, 1868, pl. xiii, fig. 1	87
Strophomenidæ.	
Strophomena, Rafinesque	87
S. (Strophodonta) demissa, Conrad, 1842, pl. xiii, fig. 6	87–88
S. (Strophodonta) subdemissa, Hall, 1856, pl. xiii, fig. 7	88
Orthis, Dalman, 1828	88
O. mcfarlanei, n. s., Meek, 1868, pl. xii, fig. 1	88–90
O. iowensis, Hall? 1858, pl. xii, fig. 2	90–91
Productidæ.	
Productus, Sowerby	91
P. dissimilis, Hall? 1858, pl. xiii, fig. 3	91
Productus ——? Meek, 1869, pl. xiii, fig. 4	91–92
Productus ——? Meek, 1869, pl. xiii, fig. 5	92
Chonetes, Fischer	93
C. pusilla, Hall? 1857, pl. xiii, fig. 2	93
Rhynchonellidæ.	
Rhynchonella, Fischer, 1809	93
R. castanea, n. s., Meek, 1868, pl. xiii, fig. 9	93–95
Rhynchonella ——? Meek, 1869, pl. xv, fig. 4	95
Pentamerus, Sowerby, 1812	95
P. borealis, n. s., Meek, 1868, pl. xiii, fig. 11	95–96
Atrypa, Dalman, 1827	96
A. aspera, Schlotheim, sp., 1820, pl. xiii, fig. 12	96–97
A. reticularis, Linn, sp., 1767, pl. xiii, fig. 13	97
Spiriferidæ.	
Cyrtina, Davidson, 1858	97
C. billingsi, n. s., Meek, 1868, pl. xiv, fig. 6	97–98
C. hamiltonensis, Hall, 1857, pl. xiv, fig. 10, and figs. 5 and 7?	99–100
C. panda, n. s., Meek, 1868, pl. xiv, fig. 8	100–101
Spirifer, Sowerby, 1815	101
S. kennicotti, n. s., Meek, 1868, pl. xiv, fig. 9	101–102
S. compactus, n. s., Meek, 1868, pl. xiv, fig. 11	102–103

	Page.
Subgenus *Martinia*, McCoy, 1844	103
S. (Martinia) sublineatus, n. s., Meek, 1868, pl. xiv, fig. 1	103–104
S. (Martinia) richardsoni, n. s., Meek, 1868, pl. xiv, fig. 2	104–105
S. (Martinia) meristoides, n. s., Meek, 1868, pl. xiv, fig. 3	106–107
S. (Martinia) franklinii, n. s., Meek, 1868, pl. xiv, fig. 12	107–108
Rensselæria, Hall, 1859	108
R. lævis, n. s., M. & W., 1868, pl. xiii, fig. 8, and pl. xiv, fig. 4	108–109
Gasteropoda.	
Pleurotomariidæ.	
Pleurotomaria, Defrance, 1826	110
Pleurotomaria ——? Meek, 1869, pl. xv, fig. 3	110
Cephalopoda.	
Nautilidæ.	
Gyroceras, Koninck, 1844	110
G. logani, n. s., Meek, 1868	110–111

61.

MEEK, F. B., *and* WORTHEN, A. H. Notes on some points in the Structure and Habits of the Paleozoic Crinoidea. <Am. Journ. Sci., vol. xlviii, 2d ser., pp. 23–40. 1869. New Haven, 1869.

A reprint from the Proc. Acad. Nat. Sci. Phila., vol. xx, pp. 323–334. (See No. 57.) Afterward republished in the Illinois Geological Reports, vol. v, and in the Canad. Nat., new series, vol. iv, pp. 434–452. (See No. 64.) For list of species see No. 57, p. 53.

62.

MEEK, F. B., *and* WORTHEN, A. H. Descriptions of new Crinoidea and Echinoidea from the Carboniferous rocks of the Western States, with a note on the Genus Onychaster. <Proc. Acad. Nat. Sci. Phila., vol. xxi, pp. 67–83. 1869. Philadelphia, 1869.

Afterward republished in the Illinois Geological Reports, vol. v.

	Page.
Synbathocrinus, Phillips, 1836	67
S. wachsmuthi, M. & W., 1866	67–68
S. brevis, n. s., M. & W., 1869	68–69
Dichocrinus, Münster, 1839	69
D. lineatus, n. s., M. & W., 1869	69
D. pisum, n. s., M. & W., 1869	69–70
Erisocrinus, M. & W., 1865	70
E. antiquus, n. s., M. & W., 1869	71–72
E. whitei, n. s., M. & W., 1869	72
Calceocrinus, Hall, 1852	72–73
C.? bradleyi, n. s., M. & W., 1869	73–74
C.? wachsmuthi, n. s., M. & W., 1869	74–75
Gilbertsocrinus, Phillips	75
Subgenus *Goniasteroidocrinus*, Lyon & Casseday, 1859	75
G. (Goniasteroidocrinus) tenuiradiatus, n. s., M. & W., 1869	75–76
G. (Goniasteroidocrinus) obovatus, n. s., M. & W., 1869	76–77
Lepidocentrus, Müller (?), 1856	77–78
L. irregularis, n. s., M. & W., 1869	78–79
Eocidaris? squamosa, n. s., M. & W., 1869	79–81
Palæchinus gracilis, n. s., M. & W., 1869	82
Onychaster, M. & W.	82–83

63.

MEEK, F. B., *and* A. H. WORTHEN. Remarks on the Blastoidea, with Descriptions of New Species. <Proc. Acad. Nat. Sci. Phila., vol. xxi, pp. 83–91. 1869. Philadelphia, 1869.

Afterward republished in the Illinois Geological Reports, vol. v.

	Page.
Granatocrinus, Troost	88
G. melonoides, n. s., M. & W., 1860	88–89
G. pisum, n. s., M. & W., 1860	89–90
G. neglectus, n. s., M. & W., 1860	90–91
G. glaber, n. s., M. & W., 1860	91

64.

MEEK, F. B., *and* WORTHEN, A. H. Notes on some points in the Structure and Habits of the Palæozoic Crinoidea. <Canad. Nat., new ser., vol. iv, pp. 434–452. 1869.

Reprinted from the Proc. Acad. Nat. Sci. Phila., 1868. (See entry numbers 61 and 87.)

65.

MEEK, F. B., *and* WORTHEN, A. H. Note on the Relations of Synocladia, King, 1849, to the Proposed Genus Septopora, Prout, 1858. <Proc. Acad. Nat. Sci. Phila., vol. xxxi, pp. 15–18. 1870. Philadelphia, 1870.

The author regards these forms as congeneric.

66.

MEEK, F. B., *and* WORTHEN, A. H. Descriptions of new Species and Genera of Fossils from the Paleozoic rocks of the Western States. <Proc. Acad. Nat. Sci. Phila., vol. xxii, pp. 22–56. 1870. Philadelphia, 1870.

Silurian and Carboniferous: Genera Codonites, Carbonarca, Clinopistha, Solenocheilus, Temnocheilus. Afterward republished and illustrated in the Illinois Geological Reports, vol. vi.

	Page.
Foraminifera.	
Receptaculites formosus, n. s., M. & W., 1870	22–23
Echinodermata.	
Barycrinus spectabilis, n. s., M. & W., 1870	23–24
Cyathocrinites? poterium, n. s., M. & W., 1870	24–26
Poteriocrinites (Zeacrinus?) concinnus, n. s., M. & W., 1870	26–27
Scaphiocrinus depressus, n. s., M. & W., 1870	27
Zeacrinus? armiger, n. s., M. & W., 1870	27–28
Zeacrinus (Hydrcionocrinus?) acanthoporus, n. s., M. & W., 1870	28–29
Eupachycrinus boydii, n. s., M. & W., 1870	30
Homocrinus angustatus, n. s., M. & W., 1870	30–31
Codonites, n. g., M. & W., 1870	31–32
C. gracilis, n. s., M. & W., 1870	32–33
Pentremites burlingtonensis, n. s., M. & W., 1870	33–34
Oligoporus coreyi, n. s., M. & W., 1870	34
Brachiopoda.	
Chonetes? millepunctata, n. s., M. & W., 1870	35–36
Spirifer fastigatus, n. s., M. & W., 1870	36–37
Stricklandinia deformis, n. s., M. & W., 1870	37–38
Lamellibranchiata.	
Monotis? gregaria, n. s., M. & W., 1870	38
Aviculopecten spinuliferus, n. s., M. & W., 1870	39
Carbonarca, n. g., M. & W., 1870	39
C. gibbosa, n. s., M. & W., 1870	40
Macrodon delicatus, n. s., M. & W., 1870	40
Modiolopsis subnasuta, n. s., M. & W., 1870	41
Schizodus amplus, n. s., M. & W., 1870	41–42
Seacrinus (Prisconata) perelegans, n. s., M. & W., 1870	42–43
Clinopistha, n. g., M. & W., 1870	43–44
C. radiata, var. *levis*, n. s., M. & W., 1870	44–45

	Page.
Gasteropoda.	
Dentalium annulostriatum, n. s., M. & W., 1870	45
Straparollus (Euomphalus) pernodosus, n. s., M. & W., 1870	45–46
S. (Euomphalus) subquadratus, n. s., M. & W., 1870	46–47
Subulites inflatus, n. s., M. & W., 1870	47
Cephalopoda.	
Nautilus, Auct.	48
Subgenus *Solenochilus*,* M. & W., 1870	48
N. (Solenochilus) collectus, n. s., M. & W., 1870	48–49
Subgenus *Temnochilus*, McCoy	49
N. (Temnochilus) latus, n. s., M. & W., 1870	49
N. (Temnochilus) winslowi, n. s., M. & W., 1870	50
N. (Temnochilus) coxanus, n. s., M. & W., 1870	50–51
Lituites graftonensis, n. s., M. & W., 1870	51–52
Crustacea.	
Phillipsia tuberculata, n. s., M. & W., 1870	52
Phillipsia (Griffithides) bufo, n. s., M. & W., 1870	52–53
Asaphus (Isotelus) vigilans, n. s., M. & W., 1870	53–54
Illaenus (Bumastus) graftonensis, n. s., M. & W., 1870	54–55
Dithyrocaris carbonarius, n. s., M. & W., 1870	55–56

67.

MEEK, F. B. Descriptions of Fossils collected by the U. S. Geological Survey under the charge of Clarence King, Esq. <Proc. Acad. Nat. Sci. Phila., vol. xxii, pp. 56–64. 1870. Philadelphia, 1870.

Silurian, Devonian, and Tertiary. Afterward republished and illustrated in vol. iv of Mr. King's series of final reports, 1877.

TERTIARY SPECIES.

	Page.
Spharium rugosum, n. s., Meek, 1870	56–75
S. idahoense, n. s., Meek, 1870	57
Ancylus undulatus, n. s., Meek, 1870	57–58
Melania (Goniobasis?) sculptilis, n. s., Meek, 1870	58
Melania (Goniobasis) subsculptilis, n. s., Meek, 1870	58–59
Carinifex binneyi, n. s., Meek, 1870	59
Carinifex (Verticifex) tryoni, n. s., Meek, 1870	59–60
Carinifex tryoni var. *concava*, n. s., Meek, 1870	30

DEVONIAN SPECIES.

Spirifer (Trigonotreta) pinonensis, n. s., Meek, 1870	60–61

LOWER SILURIAN SPECIES.

Euomphalus (Raphistoma?) rotuliformis, n. s., Meek, 1870	61
E. (Raphistoma) trochiscus, n. s., Meek, 1870	61–62
Paradoxides? nevadensis, n. s., Meek, 1870	62–63
Conocoryphe (Conocephalites) kingii, n. s., Meek, 1870	63–64

68.

MEEK, F. B. Geology of the Line of the Great Pacific Railroad. [In a letter to Dr. J. J. Bigsby.] <Geological Magazine, Decade I, vol. vii, pp. 163–164. 1870. London, 1870.

Notes the fossils obtained by Mr. Clarence King along the line of the Pacific Railway.

* σωλην, a channel; χειλος, lip.

69.

MEEK, F. B. A Preliminary List of Fossils collected by Dr. Hayden in Colora Mexico, and California, with Brief Descriptions of a few of the New <Proc. Am. Philos. Soc., vol. xi, pp. 425–431. 1870. Philadelphia, 1871.

Silurian, Carboniferous, Jurassic, Cretaceous, and Tertiary.

SILURIAN SPECIES.

Orthis coloradoensis, n. s., Meek, 1871
Bucanella nana, n. s., Meek, 1871

CRETACEOUS SPECIES.

Ammonites serrato-carinatus, n. s., Meek, 1871

TERTIARY SPECIES.

Ostrea soleniscus, n. s., Meek, 1871
Unio belliplicatus, n. s., ? Meek, 1871
Cyrena (Corbicula) durkeei, n. s., Meek, 1871

70.

MEEK, F. B. Preliminary notice of a new species of Trimerella from Ohio. Journ. Sci., vol. i, 3d ser., pp. 305–306. 1871. New Haven, 1871.

Trimerella ohioensis. Republished and illustrated in Paleontology of Ohio (Newt

71.

MEEK, F. B. On some new Silurian Crinoids and Shells. <Am. Journ. Sci. 3d ser., pp. 295–302. 1871. New Haven, 1871.

This article consists of descriptions of species, together with some extended rema genus Lichenocrinus of Hall.

Dendrocrinus casei, n. s., Meek, 1871
Lepocrinites moorei, n. s., Meek, 1871
Anodontopsis ? milleri, n. s., Meek, 1871
Anodontopsis ? unionoides, n. s., Meek, 1871
Remarks on the genus *Lichenocrinus*

72.

MEEK, F. B. Descriptions of new species of invertebrate fossils from the C erous and Devonian rocks of Ohio. <Proc. Acad. Nat. Sci. Phila., v pp. 57–93. 1871. Philadelphia, 1871.

Echinodermata.

Dolatocrinus ornatus, n. s., Meek, 1871

Lamellibranchiata.

Aviculopecten crenistriatus, n. s., Meek, 1871
Aviculopecten (streblopteria ?) hertzeri, n. s., Meek, 1871
Lucina (Paracyclas) ohioensis, n. s., Meek, 1871
[*Ptilodictya (Stictopora) gilberti*,* n. s., Meek, 1871
Conocardium ohioense, n. s., Meek, 1871
Solenomya (janeia) vetusta, n. s., Meek, 1871
Clinopistha antiqua, n. s., Meek, 1871
Sanguinolites ? sanduskyensis, n. s., Meek, 1871
Sanguinolites ? obliquus, n. s., Meek, 1871
Allorisma (Sedgwickia ?) pleuropistha, n. s., Meek, 1871

* This description was accidentally inserted by Mr. Meek in this place

	Page.
Grammysia? rhomboides, n. s., Meek, 1871	72–73
Grammysia ventricosa, n. s., Meek, 1871	73
Gasteropoda.	
Platyceras multispinosum, n. s., Meek, 1871	73–75
Platyceras attenuatum, n. s., Meek, 1871	75–76
Naticopsis levis, n. s., Meek, 1871	76
Naticopsis (Platyostoma?) æquistriata, n. s., Meek, 1871	76–77
Bellerophon newberryi, n. s., Meek, 1871	77–78
Bellerophon propinquus, n. s., Meek, 1871	78
Cyclonema crenulata, n. s., Meek, 1871	79
Isonema humilis, n. s., Meek, 1871	79–80
Orthonema newberryi, n. s., Meek, 1871	81
Trochita? antiqua, n. s., Meek, 1871	82
Trochonema tricarinata, n. s., Meek, 1871	82–84
Pteropoda.	
Conularia micronema, n. s., Meek, 1871	84
Conularia elegantula, n. s., Meek, 1871	85–86
Cephalopoda.	
Cyrtoceras ohioense, n. s., Meek, 1871	86–87
Gyroceras (Trochoceras?) ohioense, n. s., Meek, 1871	87–88
Gyroceras (Nautilus?) inelegans, n. s., Meek, 1871	89
Crustacea.	
Prostus planimargitus, n. s., Meek, 1871	89–91
Dalmanites ohioensis, n. s., Meek, 1871	91–93

73.

MEEK, F. B. Descriptions of new species of fossils from Ohio and other Western States and Territories. <Proc. Acad. Nat. Sci. Phila., vol. xxiii, pp. 159–184. 1871. Philadelphia, 1871.

This paper contains descriptions of fossils, mostly Carboniferous, from Ohio, Illinois, and Texas, with a Melantho and Viviparus from Wyoming.

OHIO COLLECTIONS.

	Page.
Fenestella delicata, n. s., Meek, 1871	159–160
Ptilodictya (Stictopora) carbonaria, n. s., Meek, 1871	160–161
Avicolopecten sandusky ensis, n. s., Meek, 1871	161–162
Pterinea (Pterinites?) newarkensis, n. s., Meek, 1871	162–163
Cypricardina? carbonaria, n. s., Meek, 1871	163–165
Schizodus medinaensis, n. s., Meek, 1871	165–166
Schizodus subtrigonalis, n. s., Meek, 1871	166
Allorisma winchelli, n. s., Meek, 1871	167–168
Allorisma ventricosa, n. s., Meek, 1871	168–169
Platyostoma? trigonostoma, n. s., Meek, 1871	169–170
Platyceras (Orthonychia?) lodiense, n. s., Meek, 1871	170–171
Platyceras tortum, n. s., Meek, 1871	171–172
Holopea (Cyclora) nana, n. s., Meek, 1871	172
Orthoceras? isogramma, n. s., Meek, 1871	172–173

ILLINOIS COLLECTIONS.

Streptacis whitfieldi, n. s., Meek, 1871	173–174
Loxonema attenuata, var. *semicostata*, Meek, 1871	174–175
Murchisonia obsolete, n. s., Meek, 1871	175
Pleurotomaria textiligera, n. s., Meek, 1871	176–177
Pleurotomaria gurleyi, n. s., Meek, 1871	177–178

COLLECTIONS FROM MISSOURI, WYOMING, TEXAS, ETC.

Aviculopecten? williamsi, n. s., Meek, 1871	178–179
Spirifer (Trigonotreta?) texanus, n. s., Meek, 1871	179–181

Page.
Campeloma (Melantho) macrospira, n. s., Meek, 1871 181–182
Viviparus? wyomingensis, n. s., Meek, 1871 182–183
Isocardia? hodgei, n. s., Meek, 1871 183–184

74.

MEEK, F. B. Notice of a new Brachiopod, from the lead-bearing rocks at Mine La Motte, Missouri. <Proc. Acad., Nat. Sci. Phila., vol. xxiii, pp. 185–187. 4 woodcuts. 1871. Philadelphia, 1871.

Page.
Lingulella lamborni, n. s., Meek, 1871, p. 185, fig. 1 185–187
Lingulella davisii (Salter), Davidson, figs. 2 and 3 185–187
Lingulepis pinniformis, Hall, fig. 4 185–187

75.

MEEK, F. B. Descriptions of new Western Palæozoic fossils, mainly from the Cincinnati Group of the Lower Silurian series of Ohio. <Proc. Acad. Nat. Sci. Phila., vol. xxiii, pp. 308–336. 1872. Philadelphia, 1871.

Afterward redescribed and illustrated in the Paleontology of Ohio (Newberry).

Radiata.
Echinodermata.
Page.
Heterocrinus exiguus, n. s., Meek, 1872 308–310
Heterocrinus subcrassus, M. & W., 1865 310
Poteriocrinites (Dendrocrinus) dyeri, n. s., Meek, 1872 310–312
Poteriocrinites (Dendrocrinus) cincinnatiensis, n. s., Meek, 1872 312–314
Poteriocrinus (Dendrocrinus) polydactylus, Shumard, sp., 1867 314
Glyptocrinus dyeri, n. s., Meek, 1872 314–316
Glyptocrinus dyeri, var. *subglobosus*, Meek, 1872 316–317
Mollusca.
Polyzoa.
Ptilodictya (Stictopora) shafferi, n. s., Meek, 1872 317–318
Brachiopoda.
Retzia (Trematospira) granulifera, n. s., Meek, 1872 318–319
Lamellibranchiata.
Ambonychia (Megaptera) alata, n. s., Meek, 1872 319–321
Megambonia jamesi, n. s., Meek, 1872 321–323
Sedgwickia? fragilis, n. s., Meek, 1872 323
Sedgwickia? compressa, n. s., Meek, 1872 324–325
Sedgwickia (Grammysia?) neglecta, n. s., Meek, 1872 325–326
Dolabra? carinata, n. s., Meek, 1872 326–327
Cardiomorpha?? obliquata, n. s., Meek, 1872 327–328
Gasteropoda.
Macrocheilus klipparti, n. s., Meek, 1872 328–330
Cephalopoda.
Orthoceras ortoni, n. s., Meek, 1872 330–331
Articulata.
Crustacea.
Cythere cincinnatiensis, n. s., Meek, 1872 331–332
Ceratiocaris (Colpocaris) bradleyi, n. s., Meek, 1872 332–333
Ceratiocaris (Colpocaris) elytroides, n. s., Meek, 1872 334
Ceratiocaris (Solenocaris) strigata, n. s., Meek, 1872 335
Archæocaris vermiformis, n. s., Meek, 1872 335–336

76.

MEEK, F. B. Descriptions of some new types of Palæozoic shells. <Am. Journ. Conch., vol. vii, pp. 4–10. 1 plate. 1871–1872. Philadelphia, 1872.

Carboniferous and Cretaceous? Genera Promacrus, Prothyris.

Page.
Sanguinolites, McCoy 4
Subgenus *Promacrus*, Meek, 1871 4–6

Page.

S. (Promacrus) nasutus, n. s., Meek, 1871, pl. i, fig. 1 .....
S. (Promacrus) missouriensis, Swallow, 1860, pl. i, fig. 2 6–7
Prothyris, Meek, 1869 8
P. elegans, n. s., Meek, 1871, pl. i, fig. 3 8–9
Martesia? roessleri, n. s., Meek, 1871, pl. i, figs. 4, 4 *a* 9–10

77.

MEEK, F. B. List of Carboniferous fossils from West Virginia, with descriptions of new species. <Appendix B, Report of Regents of West Virginia University for 1870, pp. 67–73 or 1–7. 1871. Wheeling, 1871.

Page.

Macrodon obsoletus, n. s., Meek, 1871 5
Nucula? anodontoides, n. s., Meek, 1871 5–6
Yoldia stevensoni, n. s., Meek, 1871 6
Yoldia (Palæoneilo?) carbonaria, n. s., Meek 6–7
Phillipsia stevensoni, n. s., Meek, 1871 7

78.

MEEK, F. B. Remarks on the Genus Lichenocrinus. <Ann. and Mag. Nat. Hist., ser. 4, vol. viii, pp. 341–345. 1871. London, 1871.

A reprint from Amer. Journ. Sci. & Arts, 1871. See entry number 71.

79.

MEEK, F. B. Supplementary note on the Genus Lichenocrinus. <Ann. and Mag. Nat. Hist., ser. 4, vol. ix, pp. 247–248. 1872. London, 1872.

An additional description of the characters of Lichenocrinus, founded on a number of fresh specimens. The author concludes that it is an aberrant type of Cystoidea, representing a distinct family. See entry number 80.

80.

MEEK, F. B. Supplementary Note on the Genus Lichenocrinus. <Am. Journ. Sci., vol. iii, 3d ser., pp. 15–17. 1872. New Haven, 1872.

This is supplementary to the article at page 299 of vol. ii. See entry numbers 71 and 79.

81.

MEEK, F. B. Descriptions of two new starfishes, and a Crinoid, from the Cincinnati group of Ohio and Indiana. <Am. Journ. Sci., vol. iii, 3d ser., pp. 257–262. 1872. New Haven, 1872.

These descriptions, with illustrations, are republished in the Paleontology of Ohio (Newberry).

Page.

Palæaster? dyeri, n. s., Meek, 1872 257–258
Stenaster grandis, n. s., Meek, 1872 258–259
Glyptocrinus baeri, n. s., Meek, 1872 260–261
Note on the Genus *Lichenocrinus* 261–262

82.

MEEK, F. B. Descriptions of New Species of Fossils from the Cincinnati Group of Ohio. <Am. Journ. Sci., vol. iii, 3d ser., pp. 423–428. 1872. New Haven, 1872.

These have since been redescribed and figured in the Paleontology of Ohio (Newberry).

Page.

Anomalocystites (Ateleocystites?) balanoides, n. s., Meek, 1872 423–424
Dalmanites carleyi, n. s., Meek, 1872 424–426
Proetus spurlocki, n. s., Meek, 1872 426–428

83.

MEEK, F. B. Descriptions of a few new species and one new genus of Silurian fossils from Ohio. <Am. Journ. Sci., vol. iv, 3d ser., pp. 274–281 1872. New Haven, 1872.

Genus Dicraniscus, afterward fully described and illustrated in the Paleontology of Ohio (Newberry).

	Page.
Protaster? granuliferus, n. s., Meek, 1872	274–275
Palæaster incomptus, n. s., Meek, 1872	275–277
Rhynchonella neglecta var. *scobina*, Meek, 1872	277–278
Pleurotomaria (*Scalites?*) *tropidophora*, n. s., Meek, 1872	278–279
**Dicraniscus*, n. g., Meek, 1872	279–280
D. ortoni, n. s., Meek, 1872	280–281

84.

MEEK, F. B. Preliminary Paleontological report consisting of lists of fossils, with descriptions of some new types, &c. <Prelim. Rep. U. S. Geol. Surv. of Wyoming and Portions of Contiguous Territories, pp. 287–318. 1870. Washington, 1871.

Silurian, Carboniferous, Jurassic, Cretaceous, and Tertiary, Genera Arcopagella, Crassatellina, Leptesthes, Pyrgulifera.

	Page.
General remarks	287–295
Pyrgulifera, n. g., Meek, 1871	294
Lists of fossils collected	295–299
Descriptions of new species and genera	299–318

CARBONIFEROUS SPECIES.

	Page.
Edmondia aspenwallensis, n. s., Meek, 1871	299–300

CRETACEOUS FORMS.

Crassatellina, n. g., Meek, 1871	300, 301
C. oblonga, n. s., Meek, 1871, figs. A & B, p. 301	301
Pachymya? truncata, n. s., Meek, 1871	301–302
Inoceramus altus, n. s., Meek, 1871	302–303
Unio (*Baphia?*) *nebrascensis*, n. s., Meek, 1871	303
Arca? parallela, n. s., Meek, 1871	303–304
Yoldia microdonta, n. s., Meek, 1871	304
Corbicula nucalis, n. s., Meek, 1871	304–305
Corbicula? subtrigonalis, n. s., Meek, 1871	305–306
Cardium pauperculum, n. s., Meek, 1871	306
Cardium (*Protocardia*) *salinense*, n. s., Meek, 1871	306–307
Cardium kansasense, n. s., Meek, 1871	307–308
Mactra? cañonensis, n. s., Meek, 1871	308
Arcopagella, n. g., Meek, 1871	308
A. mactroides, n. s., Meek, 1871, figs. A and B, p. 309	309–310
Tellina subscitula, n. s., Meek, 1871	310
Tapes wyomingensis, n. s., Meek, 1871	310–311
Leptosolen conradi, n. s., Meek, 1871	311–312
Anisomyon centrale, n. s., Meek, 1871	312
Turritella kansasensis, n. s., Meek, 1871	312–313
Turbo mudgeanus, n. s., Meek, 1871	313

TERTIARY SPECIES.

Unio leanus, n. s., Meek, 1871	313–314
U. washakiensis, n. s., Meek, 1871	314
Corbicula? fracta, n. s., Meek, 1871	314–315
Corbicula crassatelliformis, n. s., Meek, 1871	315–316
Goniobasis chrysallis, n. s., Meek, 1871	316
Goniobasis nodulifera, n. s., Meek, 1871	316–317
Bythinella gregaria, n. s., Meek, 1871	317–318

* Diminutive of δίκρανος a two-pronged fork.

85.

MEEK, F. B. Preliminary list of the fossils collected by Dr. Hayden's exploring expedition of 1871 in Utah and Wyoming Territories, with descriptions of a few new species. <Prelim. Rep. of U. S. Geol. Surv. of Montana and portions of adjacent Territories. [Report for 1871,] pp. 373–377. 1872. Washington, 1872.

	Page.
Silurian fossils	373
Carboniferous fossils	373–374
Platycrinites (Eucladocrinus) montanaensis, n. s., Meek, 1872	373–374
Jurassic species	374–375
Aviculopecten (Pseudomonotis?) idahoensis, n. s., Meek, 1872	374–375
Cretaceous species	375–376
Ostrea idriaensis, Gabb?!	375
Anomia? gryphorhynchus, n. s., Meek, 1872	375–376
Tertiary species	376

MEEK, F. B. Report on the Paleontology of Eastern Nebraska, with some remarks on the Carboniferous rocks of that district. <Final Rep. of the U. S. Geol. Surv. of Nebraska and portions of the adjacent Territories, pp. 83–239. 11 plates. Washington, 1872.

Carboniferous fossils only. Genus Rhombopora.

	Page.
Introductory remarks	83
Statement of a boring made in the Missouri Valley at Omaha City, by the Union Pacific Railroad Company, starting 22 feet above low-water mark of the Missouri	87–88
Section of beds exposed at Bellevue, with an enumeration of the fossils found in each	89
Section of the beds exposed on the north side of Platte River, between three and four miles from its mouth, with an enumeration of the fossils found in each bed	90–91
Section of the beds exposed at Plattsmouth, with the names of the fossils found in each	93
Section of the beds exposed at Rock Bluff, on the Missouri, with a statement of the fossils found in each	95–96
Section of the rocks seen at Cedar Bluff	98
Section at Wyoming, with an enumeration of the imbedded fossils	99
Section at Bennett's mill	100
Section of beds exposed at the Nebraska City landing, with an enumeration of the fossils found in each	101–102
Section 1¾ and 2¾ miles due west of Nebraska City	103
Mr. Croxton's boring at Nebraska City	105–107
Section of the beds exposed at Otoe City	107–108
Sections of the various beds exposed at Brownville	110
Sections one and a half miles below Brownville	111–112
Sections of beds exposed at Aspinwall	112–113
Section two miles above Rulo, on the Missouri	114
Shaft and boring one and one-fourth miles south of Rulo	115
Section of a boring two miles south of Saint Joseph, 60 feet above high water of the Missouri	117–118
Section of the rocks exposed at Riverside, Kansas, and along the river bluff between there and the Atchison Landing	119–120
Boring at Atchison, Kansas, commencing 22½ feet above high-water mark of the Missouri; made by the Atchison Coal Company, 1865–'66	121–122
Tabular list, illustrating the geological and geographical range of the fossils of Eastern Nebraska	124–127
Remarks on the probability of finding valuable beds of coal within profitable working distance of the surface in Eastern Nebraska	134–139

DESCRIPTIONS OF FOSSILS.

Protozoa.	
Foraminifera.	
Fusulina, Fischer.	
F. cylindrica, Fischer, 1837, pl. i, fig. 2; pl. ii, fig. 1; pl. v, figs. 3 *a*, *b*; pl. vii, figs. 8 *a*, *b*	140–141
Radiata.	
Polypi.	
Rhombopora, Meek, n. g., 1872	141
R. lepidodendroides, n. s., Meek, 1872, pl. vii, figs. 2 *a–f*	141–143
Fistulipora, McCoy	143

P

F. nodulifera, n. s., Meek, 1872, pl. v, figs. 5 *a–d*... 141
Syringopora, Goldfuss
S. multattenuata, McChesney, 1860, pl. i, figs. 5 *a–d*
Lophophyllum, Edwards & Haime
L. proliferum, McChesney, sp., 1860, pl. v, figs. 4 *a, b*... 14
Campophyllum, Edwards & Haime
C. torquium, Owen, sp., 1852, pl. i, figs. 1 *a–d*... 14
Echinodermata.
Eriocrinus, M. & W
E. typus, M. & W., 1865, pl. i, figs. 3 *a, b*, and fig. 1, p. 146... 14
Scaphiocrinus, Hall
S.? hemisphæricus, Shumard, sp., 1858, pl. v, figs. 1 *a, b*; pl. vii, figs. 1 *a–c*, and fig. 2, p. 148... 14
Zeacrinus, Troost
Z.? mucrospinus, McChesney, 1860, pl. v, figs. 2 *a–c*... 14
Eupachycrinus, M. & W
E. verrucosus, White & St. John, 1869, figs. 3 and 4 *a–d*, p. 150... 15
Archæocidaris, McCoy
A.? triserrata, n. s., Meek, 1872, pl. i, figs. 6 *a–c*... 15
Eocidaris, Desor
E. hallianus, Geinitz, 1866, pl. vii, figs. 9 *a–d*
Mollusca.
Polyzoa.
Fenestella, Lonsdale
Fenestella, sp., pl. i, figs. 4 *a, b*... 152
F. shumardi, Prout?, 1858, pl. vii, figs. 3 *a–c*... 153
Polypora, McCoy
P. submarginata, n. s., Meek, 1872, pl. vii, figs. 7 *a, b*... 154
Polypora, sp. undt., Meek, pl. vii, figs. 6
Synocladia, King
S. biserialis, Swallow, 1858, pl. vii, figs. 5 *a–c*... 156
Glauconome, Goldfuss
G. trilineata, Meek, n. s., 1872, pl. vii, figs. 4 *a–d*... 157
Brachiopoda.
Lingula, Bruguière
L. scotica, var. *nebrascensis*, Meek, 1872, pl. viii, figs. 3 *a, b*
Orbiculoidea, d'Orbigny
Orbiculoidea, sp., pl. iv, fig. 3... 158
Productus, Sowerby
P. costatus, Sowerby?† sp., 1827, pl. vi, figs. 6 *a, b*... 159
P. semireticulatus, Martin, sp., 1809, pl. v, figs. 7 *a, b*... 160
P. longispinus, Sowerby, † 1814, pl. vi, fig. 7, and pl. viii, figs. 6 *a–c*... 161
P. prattenianus, Norwood, 1854, pl. ii, figs. 5 *a–c*, pl. v, fig. 13, and pl. viii, figs. 10 *a, b*.. 162
P. pertenuis, n. s., Meek, 1872, pl. i, figs. 14 *a–c*, and pl. viii, figs. 9 *a–d*... 164
P. nebrascensis, Owen, 1852, pl. ii, fig. 2, pl. iv, fig. 6, and pl. v, figs. 11 *a–c*... 165
P. symmetricus, McChesney, 1860, pl. v, figs. 6 *a, b*, and pl. viii, fig. 13... 167
P. punctatus, Martin, sp., 1809, pl. ii, fig. 6, and pl. iv, fig. 5
Chonetes, Fischer
C. verneuiliana, Norwood & Pratten, 1854, pl. i, figs. 10 *a, b*
C. granulifera, Owen, 1855, pl. iv, fig. 9, pl. vi, fig. 10, pl. viii, fig. 7... 17
C. glabra, Geinitz, 1866, pl. iv, fig. 10, pl. viii, figs. 8 *a, b*... 17
Orthis, Dalman
O. carbonaria, Swallow, 1858, pl. i, figs. 8 *a–c*
Hemipronites
H. crassus, M. & H., 1858, pl. v, figs. 10 *a–c*, and pl. viii, fig. 1... 17
Meekella, White & St. John
M. striato-costata, Cox, sp., 1857, pl. v, figs. 12 *a–c*, and figs. 5 *a, b*, and 6, p. 175... 17
Syntrielasma, M. & W
S. hemiplicata, Hall, sp., 1852, pl. vi, figs. 1 *a, b*, and pl. viii, figs. 12 *a, b*, and figs. 7 *a–c*, figs. 8 *a, b*, p. 177... 17
Rhynchonella, Fischer
R. osagensis, Swallow, 1858, pl. i, figs. 9 *a, b*, and pl. vi, figs. 2 *a, b*... 17
Athyris, McCoy
A. subtilita, Hall, sp., 1852, pl. i, fig. 12, pl. v, fig. 8, and pl. viii, fig. 4... 18
Retzia, King

	Page.
R. punctulifera, Shumard, 1858, pl. i, fig. 13, and pl. v, fig. 7	181–183
Spirifer, Sowerby	183
S. cameratus, Morton, 1836, pl. vi, fig. 12, and pl. viii, fig. 15	183–184
S. (Martinia) planoconvexus, Shumard, 1855, pl. iv, figs. 4 *a*, *b*, and pl. viii, figs. 2 *a*, *b*	184–185
Spiriferina, d'Orbigny	185
S. kentuckensis, Shumard, 1855, pl. vi. figs. 3 *a–d*, and pl. viii, figs. 11 *a*, *b*	185–186
Terebratula, Llhwyd	187
T. bovidens, Morton, 1836, pl. i, figs. 7 *a–d*, and pl. ii, fig. 4	187–188
Lamellibranchiata.	
Lima, Bruguière	188
L. retifera, Shumard, 1858, pl. ix, fig. 5	188–189
Entolium, Meek	189
E. aviculatum, Swallow, sp., 1858, pl. ix, figs. 11 *a–f*	189–191
Aviculopecten, McCoy	191
A. occidentalis, Shumard, sp., 1855, pl. ix, fig. 10	191–193
A. neglectus, Geinitz, sp., 1866, pl. ix, figs. 1 *a*, *b*	193
A. carboniferus, Stevens, sp., 1858, pl. iv, fig. 8 and pl. ix, figs. 4 *a*, *b*	193–195
A. whitei, n. s., Meek, 1872, pl. iv, figs. 11 *a–c*	195
A. coxanus, M. & W., 1860, pl. ix, figs. 2 *a*, *b*	196
Aviculopinna, Meek	197
A. americana, Meek, 1867, pl. ix, figs. 12 *a–d*	197–198
Pinna, Linnæus	198
P. peracuta, Shumard, 1858, pl. vi, fig. 11 *a*, *b*	198
Avicula (Klein), Brug	199
A. longa, Geinitz, sp., 1866, pl. ix, fig. 8	199
A.? sulcata, Geinitz, 1866, pl. ix, fig. 9	200
Pseudomonotis, Beyrich	200
Pseudomonotis, sp., pl. ii, fig. 11	200–201
P. radialis, Phillips?? sp., 1834, pl. ix. fig. 3	201
Myalina, de Koninck	201
M. [?] swallovi, McCheaney, 1860, pl. ix, figs. 7 *a*, *b*	201–202
M. subquadrata, Shumard, 1855, pl. iv, fig. 12 and pl. ix, fig. 6	202–203
Nucula, Lamarck	203
N. beyrichi, v. Schauroth? 1854, pl. x, fig. 18	203–204
N. ventricosa, Hall, 1858, pl. x, figs. 17 *a–c*	204–205
Yoldia, Möller	205
Y. subscitula, M. & H., ? 1858, pl. x, fig. 10	205–206
Nuculana, Link	206
N. bellistriata var. *attenuata*, pl. x, figs. 11 *a*, *b*	206–207
Macrodon, Lycett	207
M. tenuistriata, M. & W., 1867, pl. x, figs. 20, *a*, *b*	207–208
Schizodus, King	208
S. curtus, M. & W., ? 1866, pl. x, figs. 13 *a–c* (*d*?), *e*	208–209
S. wheeleri, Swallow, sp., 1862, pl. x, figs. 1 *a–d* (and *e*, *f*?)	209–210
Schizodus, undt. pl. x, fig. 2	210–211
Modiola, Lamarck	211
M.? subelliptica, Meek, 1867, pl. x, fig. 5	211–212
Pleurophorus, King	212
P. oblongus, n. s., Meeks, 1872, pl. x, fig. 4 *a–c*	212
P. occidentalis, M. & H., ? 1858, pl. x, fig. 12	212–213
Edmondia, de Koninck	213
E. reflexa, n. s., Meek, 1872, pl. x, figs. 6 *a*, *b*, and pl. iv, fig. 7?	213–214
E.? glabra n. s., Meek, 1872, pl. x, figs. 7 *a*, *b*	214
E.? nebrascensis, Geinitz, sp., 1866, pl. x, figs. 8 *a*, *b*	214–215
E. subtruncata n. s., Meek, 1872, pl. ii, fig. 7	215–216
E. aspinwallensis, Meek, 1871, pl. iv, figs. 2 *a–c*	216
Chænomya, M. & H	210
C. leavenworthensis, M. & H., 1858, pl. ii, fig. 9	216–217
C. minnehaha, Swallow, sp., 1858, pl. — figs. 13 *a*, *b*	217
Allorisma, King	217
A. (Sedgwickia) reflexa, n. s., Meek, 1872, pl. x, fig. 15	217–218
A. (Sedgwickia) geinitzii, Meek, 1867, pl. x, figs. 16 *a*, *b*	219
A. (Sedgwickia?) subelegans n. s., Meek, 1872, pl. x, fig. 14	220
A. (Sedgwickia) granosa, Shumard, sp., 1858, pl. ii, fig. 8	220–221
A. subcuneata, M. & H., 1858, pl. ii, figs. 10 *a*, *b*	221–222

P

Prothyris, Meek
P. elegans, Meek, 1871, pl. x, figs. 9 *a*, *b*
Solenopsis, McCoy
S. solenoides, Geinitz, sp., 1866, pl. x, fig. 8 ... 23
Gasteropoda, Cuvier.
Dentalium, Linnæus
D. meekianum, Geinitz, 1866, pl. xi, figs. 16 *a*, *b*
Bellerophon, Montfort
B. carbonarius, Cox, 1857, pl. iv, fig. 16, pl. xi, figs. 11 *a–c* ... 22
B. montfortianus, Norwood & Pratten, 1855, pl. xi, fig. 15, and 12? ... 22
B. marcouianus, Geinitz, 1866, pl. iv, fig. 17, and pl. xi, figs. 13 *a*, *b* ... 22
B. percarinatus, Conrad, 1842, pl. xi, fig. 14
Platyceras, Conrad
P. nebrascensis, n. s., Meek, 1872, pl. iv, figs. 15 *a*, *b* ... 22
Macrocheilus, Phillips
M. intervalaris var. *pulchellus*, M. & W., 1860, pl. vi, fig. 8
Orthonema, M. & W
O. subtaeniata, Geinitz, sp., 1866, pl. xi, fig. 10 ... 22
Aclis, Loven
A. woalloviana, Geinitz, sp., 1866, pl. xi, figs. 7 *a*, *b* ... 22
Straparollus, Montfort
S. (Euomphalus) rugosus, Hall, 1858, pl. vi, figs. 5 *a*, *b*, and pl. xi, figs. 4 *a*, *b* ... 23
Pleurotomaria, Defrance
P. haydeniana, Geinitz, 1866, pl. xi, fig. 5
P. perhumerosa, n. s., Meek, 1872, pl. iv, figs. 13 *a*, *b*
P. inornata, n. s., Meek, 1872, pl. iv, fig. 14 ... 23
P. grayvillensis, Norwood & Pratten, 1855, pl. xi, fig. 9
P. marcouiana, Geinitz, 1866, pl. xi, fig. 8
P. subdecussata, Geinitz, 1866, pl. xi, fig. 19
Murchisonia, de Verneuil
M. nebrascensis, Geinitz, 1866, pl. xi, fig. 6
Cephalopoda.
Orthoceras, Auct
O. cribrosum, Geinitz, 1866, pl. xi, figs. 18 *a*, *b*
Nautilus, Linn
N. occidentalis, Swallow, 1858, pl. xi, fig. 17 ... 23
N. ponderosus, White, M. S., 1872, pl. iii, figs. 7 *a*, *b*

Articulata.
Crustacea.
Cythere, Müller
C. nebrascensis, Geinitz, 1866, pl. xi, figs. 2; and 3 *a*, *b*?
Cythere, sp., pl. xi, figs. 1 *a–d*
Phillipsia, Portlock
Phillipsia, sp., Geinitz, 1866, pl. iii, figs. 1 *a*, *b* ... 23
P. scitula, M. & W., 1865, pl. vi, fig. 9
P. major, Shumard, 1858, pl. iii, figs. 2 *a–c* ... 23

MEEK, F. B. [Geological reports on Miller, Morgan, and Saline Counties, Missou
<Reports on the Geological Survey of the State of Missouri, 1855–'71, by G
Broadhead, F. B. Meek, and B. F. Shumard, chapters vii–ix, pp. 111–188. Je
son City, 1873.

Geological maps of Miller and Morgan Counties accompany these reports.

CHAPTER VII.

P

Miller County
Streams
Springs
Timber
Geological structure of Miller County
Quaternary system.—Alluvium
Carboniferous system
Lower Silurian rocks.—Saccharoidal sandstone

Page.
Second magnesian limestone 118
Second sandstone 121
Third magnesian limestone 123
Third sandstone 127
Fourth magnesian limestone 127
Economical geology 128
Soil, clays for the manufacture of bricks 128
Building stones 128
Road material, limestone for quicklime, sand 129
Iron ore 130
Lead 131
Coal 132
Sulphate of baryta 133

CHAPTER VIII.

Morgan County 135
Springs 136
Streams 137
Timber 138
Geological structure 138
Quaternary system.—Alluvium 139
Carboniferous rocks.—Coal measures 140
Encrinital limestone 140
Chouteau limestone 141
Silurian system 141
First magnesian limestone 141
Saccharoidal sandstone 142
Second magnesian limestone 143
Second sandstone 144
Third magnesian limestone 145
Third sandstone 147
Fourth magnesian limestone 148
Economical geology 149
Soils 149
Coal 149
Lead 152
Iron ore 155
Heavy spar 156
Building material 156

CHAPTER IX.

Saline County 157
Streams 158
Timber 159
Geological structure 160
Quaternary deposits 161
Alluvium of the Missouri Flats 161
Bluff or Loess Deposit 161
Drift 162
Carboniferous rocks.—Coal measures 163
Ferruginous sandstone 172
Archimedes limestone 172
Encrinital limestone 173
Chouteau limestone 174
Cooper marble 176
Semi-crystalline limestone 176
Silurian system 178
Trenton limestone ? 178
Saccharoidal sandstone 178
Economical geology 179
Soil 179
Coal 180
Building stone 180
Limestones for making lime, sand, clays for bricks, &c 181
Springs 18

88.

MEEK, F. B. Spergen Hill fossils identified among specimens from Idaho. <Am. Journ. Sci., vol. v, 3d ser., pp. 383, 384. 1873. New Haven, 1873.

The author identifies, among some collections made by Prof. F. H. Bradley, some of the minute species of Mollusca, for which the locality in Washington County, Indiana, known as Spergen Hill, is noted. A list of the species identified is given, but no discussion of them is made.

89.

MEEK, F. B. Preliminary Paleontological Report, consisting of lists and descriptions of fossils, with remarks on the ages of the rocks in which they were found, &c., &c. <Sixth Ann. Report of the U. S. Geol. Survey of the Territories, pp. 431–518. 1873. Washington, 1873.

Genera Admetopsis, Velatella.

	Page.
General remarks	431
Silurian age	431–432
Carboniferous age	433–434
Jurassic age	434–435
Cretaceous age	435–438
Section from about 1¼ miles northeast of Coalville, in a northwesterly direction, to Echo Cañon, fig. 52	439–440
Section of the rocks exposed on Sulphur Creek, near Bear River, Wyoming, fig. 53	451–452
Tertiary age	462
Lists of fossils collected	463

Descriptions of new species of fossils.

SILURIAN FORMS.

Iphidea (?) sculptilis, n. s., Meek, 1873	479
Acephus (Megalaspis?) punctocrenus, n. s., Meek, 1873	480
Bathyurus serratus, n. s., Meek, 1873	480–482
B. ? haydeni, n. s., Meek, 1873	482–484
Bathyurellus (Lopiorus) bradleyi, n. s., Meek, 1873	484–485
Conocoryphe (Ptycheparia) gallatinensis, n. s., Meek, 1873	485–487

CRETACEOUS FORMS.

Ostrea solomonis, Meek, 1870	487–488
Ostrea anomioides, n. s., Meek, 1873	488

	Page.
Turbonilla (Chemnitzia ?) coalvillensis, n. s., Meek, 1873	505–506
Eulima funicula, n. s., Meek, 1873	506
Eulima chrysalis, n. s., Meek, 1873	506
Eulima ? inconspicua, n. s., Meek, 1873	507
Melampus antiquus, n. s., Meek, 1873	507
Valvata nana, n. s., Meek, 1873	507
Physa carletoni, n. s., Meek, 1873	508
Species from the Bitter Creek series.	
Ostrea wyomingensis, Meek, 1872	508–509
Anomia (Placunopsis ?) gryphorhyncus, Meek, 1871	509–511
Corbicula (Veloritina) cytheriformis, M. & H., 1860	511
Corbicula ? fracta, var. *crassiuscula*, Meek, 1873	512–513
Corbicula (Veloritina) bannisteri, n. s., Meek, 1873	513
Corbula undifera, n. s., Meek, 1873	513–514
Corbula tropidophora, n. s., Meek, 1873	514–515
Goniobasis ? insculpta, n. s., Meek, 1873	515–516
Melania (Goniobasis?) wyomingensis, n. s., Meek, 1873	516
Tertiary forms.	
Physa bridgerensis, n. s., Meek, 1873	516–517
Limnæa (Limnophysa?) compactilis, n. s., Meek, 1873	517
Pupa ? leidyi, n. s., Meek, 1873	517–518

90.

MEEK, F. B. Descriptions of Invertebrate fossils of the Silurian and Devonian systems. <Geol. Surv. of Ohio, vol. i, part ii. Palæontology, pp. 1–243, plates 1–23, and 3 plates of diagrams of Crinoids. 1873. Columbus, 1873.

FOSSILS OF THE CINCINNATI GROUP.

Radiata.

Echinodermata.

Crinoidea.

	Page.
Heterocrinus, Hall, 1847	1–2
H. constrictus, Hall, 1866, pl. i, figs. 10 *a*, *b* (and 11 ?)	3–5
H. exilis, Hall ? 1868, pl. i, fig. 12	5–7
H. simplex, Hall, 1847, pl. i, figs. 4 *a*, *b*; 5 *a*, *b* (with 6 *a*, *b* and 7 *a–c* ?)	7–10
H. juvenis, Hall, 1866, pl. i, figs. 3 *a–c*	10–12
H. heterodactylus, Hall ? 1847, pl. i, figs. 1 *a*, *b* (and 2 *a*, *b* ?)	12–14
H. laxus, Hall, 1872, pl. i, figs. 8 *a*, *b*	14, 15
H. (Iocrinus) suborassus, M. and W., 1865, pl. i, figs. 9 *a*, *b*	15–17
Anomalocrinus, M. and W., 1868	17
A. incurvus, M. and W., 1865, pl. ii, figs. 6 *a–f*	17–20
Poteriocrinites, Miller, 1821	20
Subgenus (*Dendrocrinus*) Hall, 1852	20
P. (Dendrocrinus) cincinnatiensis, Meek, 1872, pl. iii bis, figs. 5 *a*, *b*	20–22
P. (Dendrocrinus) polydactylus, Shumard, sp. 1867, pl. iii bis, fig. 9	22
P. (Dendrocrinus) posticus, Hall, 1872, pl. iii bis, figs. 4 *a–c*	22–24
P. (Dendrocrinus) dyeri, Meek, 1872, pl. iii bis, figs. 3 *a*, *b*	24–25
P. (Dendrocrinus) caduceus, Hall, 1866, pl. 3 bis, figs. i, *a–d*	26–27
P. (Dendrocrinus) casei, Meek, 1871, pl. iii bis, figs. 2 *a–c*	28–30
Glyptocrinus, Hall, 1847	30
G. decadactylus, Hall, 1847, pl. ii, figs. 5 *a*, *b*	30–32
G. dyeri, Meek, 1872, pl. ii, figs. *a*, *b*	32–34
G. dyeri var. *sub-globosus*, Meek, 1872, pl. ii, fig. 2, *c*	34
G. nealli, Hall, 1866, pl. ii, figs. 3 *a–c*	34–36
G. parvus, Hall, 1872, pl. ii, figs. 4 *a*, *b*	36–37
G. baeri, Meek, 1872, pl. ii, figs. 1 *a*, *b*	37–39

Cystoidea.

Lepacrinites, Conrad, 1840	39
L. moorei, Meek, 1871, pl. iii, figs. 4 *a–c*	39–41
Anomalocystites, Hall, 1859	41
A. (Atelocystites ?) balanoides, Meek, 1872, pl. iii bis, ?	41–44
Lichenocrinus, Hall, 1866	4
L. dyeri, Hall, 1866, pl. iii, figs. 2 (and 3 *a*, *b* ?)	

P.

L. craterîformis, Hall, 1866, pl. iii, figs. 1 *a–i*. 1
Hemicystites, Hall
H. stellatus, Hall, 1866, pl. iii, figs. 8 *a, b* 1
H. (*Cystaster*) *granulatus*, Hall, 1872, pl. iii, figs. 9 *a, b*
Agelacrinites, Vanuxem, 1842
A. (*Lepidodiscus*) *cincinnatiensis*, Rœmer, 1851, pl. iii, figs. 6 *a, b*
A. pileus, Hall, 1866, pl. iii, fig. 5
A. verticellata, Hall, 1866, pl. iii, figs. 7 *a, b*
Asteroidea.
Palæaster, Hall.
P.? dyeri, Meek, 1872, pl. iv, figs. 2 *a–f*
P. granulosus, Hall? 1866, pl. iv, figs. 3 *a–c*
P.? jamesii, Dana, 1863, pl. iv, fig. 4
P. incomptus, Meek, 1872, pl. iv, figs. 5 *a, b*
P. shaefferi, Hall, 1868, pl. iv, fig. 1
Stenaster Billings, 1858
S. grandis, Meek, 1872, pl. iii bis, fig. 7 *a–c* 1
Ophiuroidea.
Protaster?, Forbes, 1849
P. granuliferus, Meek, 1872, pl. iii bis, figs. 8 *a, b* 1
Mollusca.
Polyzoa.
Ptilodictya, Lonsdale, 1839
P. (*Stictopora*) *shafferi*, Meek, 1872, pl. v, figs. 1 *a–c* 1
Brachiopoda.
Leptæna, Dalman, 1828
L. sericea, Sowerby ? 1839, pl. v, figs. 3 *a–h* 7
Strophomena, Rafinesque, 1827 7
S. rhomboidalis, Wilckens sp., 1769, pl. v, figs. 6 *a–c* 7
Subgenus *Hemipronites*, Pander
(Resupinate species.)
S. (*Hemipronites*) *nutans*, James, 1871, pl. vi, figs. 1 *a–f* 7
S. (*Hemipronites*) *planumbona*, Hall, 1847, pl. vi, figs. 3 *a–h* 7
S. (*Hemipronites*) *plicata*, James, 1871, pl. vi, figs. 4 *a–h* 8
S. (*Hemipronites*) *plano-convexa*, Hall, 1847, pl. ii, figs. 2 *a–h* 8
S. (*Hemipronites*) *flitexta*, Hall, 1847, pl. vi, figs. 5 *a–d* 8
S. (*Hemipronites*) *sulcata*, de Verneuil, 1848, pl. v, figs. 4 *a–c* 8
S. (*Hemipronites*) *sinuata*, James, 1871, pl. v, figs. 5 *a–f* 8
(Non-resupinate species.)
S. (*Hemipronites*) *alternata* (Conr.), Emmons, 1838, pl. vii, figs. 1 *a–g* 8
Orthis, Dalman, 1828
(Resupinate species.)
O. retrorsa, Salter ? 1858, pl. xi, figs. 7 *a–c* 9
O. subquadrata, Hall, pl. ix, figs. 2 *b–g* 9
O. occidentalis, Hall, 1847, pl. ix, figs. 3 *a–h* 9
O. insculpta, Hall, 1847, pl. ix, figs. 1 *a–h* 99
O. borealis, Billings, 1859, pl. viii, figs. 4 *a–f* 101
O. bellula, James, 1871, pl. viii, figs. 5 *a–f* 103
O. (*?*) *ella*, Hall, 1861, pl. viii, figs. 9 *a–d* 105
(Non-resupinate species.)
O. fissicosta, Hall, 1847, pl. viii, figs. 6 *a–h* 106
O. plicatella, Hall, 1847, pl. viii, figs. 7 *a–h* 108
O. emacerata, Hall, 1860, pl. viii, figs. 1 *a–d*, and figs. 2 *a–g* 109
O. emacerata var. *multisecta*, James, 1871, pl. viii, figs. 3 *a–d*
O. (*Platystrophia*) *biforata*, Schlotheim, sp., 1820, pl. x 112
Var. 1. *O.* (*Platystrophia*) *lynx*, Von Buch., pl. x, figs. 1 *a–c* 114
Var. 2. *O.* (*Platystrophia*) *laticosta*, James, 1871, pl. x, figs. 4 *a–f* 116
Var. 3. *O.* (*Platystrophia*) *dentata*, Pander ? ? James, 1871, pl. x, figs. 3 *a–d* 117
Var. 4. *O.* (*Platystrophia*) *acutilirata*, Con., sp., 1842, pl. x, figs. 5 *a–g* 119
Rhynchonella, Fischer de Waldh., 1809
R. dentata, Hall, 1847, pl. xi, figs. 3 *a–d* 121
R. capax, Conrad, sp., 1842, pl. xi, figs. 6 *a–f* 122
Zygospira, Hall, 1862
Z. modesta, Say, sp., pl. xi, figs. 4 *a–d* 125
Z. cincinnatiensis, James, 1871, pl. xi, figs. 5 *a–c*

Page.

E. headi, Billings, sp., 1862, pl. xi, figs. 1 *a–d* 127–128
Retzia, King, 1850 128
R. (Trematospira) granulifera, Meek, 1872, pl. xi, figs. 6 *a–e* 128–129
Pholidops, Hall, 1860 130
P. cincinnatiensis, Hall, 1872, pl. v, figs. 2 *a*, *b* 130
Lamellibranchiata.
Ambonychia, Hall, 1847 130
A. costata, James, 1871, pl. xii, figs. 5 *a–c* 130–131
A. (Megaptera) alata, Meek, 1872, pl. xi, fig. 9, and pl. xii, fig. 10 131–132
A. (Megaptera) casei, M. & W. ?, 1866, pl. xi, fig. 8 133
Cypricardites, Conrad, 1841 133
C. sterlingensis, M. & W. ? sp., 1866, pl. xi, figs. 12 *a*, *b* 133–135
C. ? carinata, Meek, 1872, pl. xii, figs. 6 *a*, *b* 135–136
Megambonia, Hall, 1859 136
M. jamesi, Meek, 1871, pl. xii, figs. 9 *a*, *b* 136–138
Okidophorus, Hall, 1847 138
O. (Nuculites ?) fabula, Hall, sp., 1845, pl. xi, figs. 10 *a*, *b* 138–139
Tellinomya, Hall, 1847 139
T. ? obliqua, Hall, sp., 1845, pl. xi, figs. 11 *a–c* 139
Anodontopsis, McCoy, 1851 140
A. ? milleri, Meek, 1871, pl. xii, figs. 1 *a–d* 140–141
A. (Modiolopsis ?) unionoides, Meek, 1871, pl. xii, figs. 2 *a*, *b* 141–142
Sedgwickia, McCoy, 1844 142
S. (? Grammysia) neglecta, Meek, 1872, pl. xii, fig. 8 142–143
S. ? fragilis, Meek, 1872, pl. xii, figs. 3 *a*, *b* 143–144
S. ? compressa, Meek, 1872, pl. xii, figs. 7 *a*, *b* 144–145
Cardiomorpha, de Koninck, 1844 146
C. ?? obliquata, Meek, 1872, pl. xii, figs. 4 *a*, *b* 146–147
Gasteropda.
Cyrtolites, Conrad, 1838 147
C. (Microceras) inornatus, Hall, sp., 1845, pl. xiii, figs. 4 *a*, *b* 147–148
C. ornatus, Conrad, 1838, pl. xiii, figs. 3 *a*, *b* 148–149
C. dyeri, Hall, 1871, pl. xiii, figs. 2 *a–e* 149–150
C. ? costatus, James, 1872, pl. xiii, figs. 1 *a–c* 150
Cyclonema, Hall, 1852 151
C. bilix, Conrad sp., 1842, pl. xiii, figs. 5 *a*, *c*, *d*, *g*, and 5 *e*, *f* ? 151–152
Cyclora, Hall, 1845 152
C. minuta, Hall, 1845, pl. xiii, figs. 7 *a–c* 152–153
C. ? parvula, Hall, sp., 1845 154
Pleurotomaria, Defrance, 1826 154
P. (Scalites ?) tropidophora, Meek, 1872, pl. xiii, figs. 6 *a–c* 154–155
Cephalopoda.
Orthoceras, Auct.
O. ortoni, Meek, 1872, pl. xiii, fig. 8 155–156
Trochoceras, Barrande, 1847 157
T. ? baeri, M. & W., 1865, pl, xiii, fig. 9 157–158
Articulata.
Crustacea.
Entomostraca.
Cythere, Muller, 1785 158
C. cincinnatiensis, Meek, 1872, pl. xiv, figs. 1 *a–d* 158–159
Asaphus, Brongniart, 1822 159
A. (Isotelus) megistos, Locke ? 1842, pl. xiv, fig. 13 159–160
Proetus, Steininger, 1831.
P. spurloski, Meek, 1872, pl. xiv, fig. 12 161–162
Ceraurus, Green, 1833 622
C. icarus, Billings, 1859, pl. xiv, figs. 11 *a–c* 162–165
Acidaspis, Murchison, 1839 165
A. crassotus, Locke, ? 1842, pl. xiv, figs. 10 *a*, *b* 165–167
A. cincinnatiensis, Meek, n. sp., 1873, pl. xiv, fig. 3 167–169
A. scalepta, Anthony, sp.?, 1838, pl. xiv, figs. 8, 9 169–170
Dalmanites, Barrande, 1852 170
D. carleyi, Meek, 1872, pl. xiv, figs. 2 *a–d* 170–173
Calymene, Brongniart, 1822 173
C. senaria, Conrad, 1841, pl. xiv, figs. 14 *a–f* 173–175

FOSSILS OF THE NIAGARA AND CLINTON GROUPS.

Pa

[illegible] Hall, 1859 17
[illegible]ecak, 1872, pl. xv, figs. 1 *a–k* 17
[illegible]a, Fischer, 1809 .....
[illegible], Hall, 1852, pl. xv, figs. 3 *a–d* 17
[illegible] Hall, 1860 .....
[illegible]*cylindrica*, Hall, sp., 1852, pl. xv, figs. 2 *a–d* 180
[illegible]*da*, Billings, 1862 .....
[illegible]*dis*, Billings, 1862, pl. xvi, figs. 2 *a*, *b* .....
[illegible]*ensis*, Meek, 1871, pl. xvi, figs. 1 *a–c*, and figs. *a*, *b*, p. 183 183
[illegible]*poda*.
[illegible]*stoma*, Conrad, 1842 9
[illegible]*ensis* var. *trigonostoma*, pl. xvi, figs. 3 *a–c*, and fig. p. 186 185-1
[illegible]*poda*.
[illegible]*ites*, Montfort, 1808 .....
[illegible] *ortoni*, Meek, n. s., 1873, pl. xv, fig. 4 186
[illegible]*ata*.
[illegible]*acea*.
Leperditia, Rousault, 1851 .....
L. alta, Conrad, sp., 1843, pl. xvii, figs. 2 *a*, *b* 187
Illaenus, Dalman, 1826 .....
I. (*Bumastus*) *insignis*, Hall, ? 1864, pl. xv, figs. 5 *a–c*, and figs. *a* and *b*, p. 189 189

FOSSILS OF THE CARBONIFEROUS GROUP.

[illegible]*ozoa*.
[illegible]*ozoa*.
Ptilodictya, Lonsdale, 1839 .....
P. (*Stictopora*) *gilberti*, Meek, 1871, pl. xviii, figs. 1 *a–e* 194
Brachiopoda.
Rhynchonella, Fischer, 1809 .....
R. carolina, Hall, 1867, pl. xviii, figs. 8 *a–e* 196
Lamellibranchiata.
Aviculopecten, McCoy, 1851 .....
A. parilis, Conrad, ? 1842, pl. xviii, figs. 6 *a*, *b* 197
Lucina, Bruguiere, 1792 .....
L. (*Paracyclas*) *ohioensis*, Meek, 1871, pl. xviii, fig. 7 *a*, *b* 199
L. lirata, Conrad, sp., fig. --, p. 200 .....
Conocardium, Brown, 1835. ? .....
C. trigonale, Hall, 1843, figs. *A–C*, p. 201, and figs. *A*, *B*, p. 204 201
C. ohioense, Meek, 1871, pl. xviii, fig. 9, and figs. *A* and *B*, p. 204 20

	Page.
Bellerophon, Montfort, 1808	222
B. newberryi, Meek, 1871, pl. xx, fig. 5, and fig. —, p. 223	222–225
B. patulus, Hall, fig. —, p. 223	223
B. propinquus, Meek, 1871, pl. xx, figs. 4 *a–b*	226
Pleurotomaria, Defrance, 1826	226
P. lucina, Hall?, 1862, pl. xx, fig. 6	226–227
Conularia, Miller, 1818, MS	228
C. elegantula, Meek, 1871, pl. xxiii, fig. 4	228–229
Cephalopoda.	
Cyrtoceratites, Goldfuss, 1830?	229
C. ohioensis, Meek, 1871, pl. xxiii, figs. 2 and 2 *b*	229–230
Gyroceratites, Meyer, 1831	230
G. (? Trochoceras) ohioensis, Meek, 1871, pl. xxii	230–231
G. (? Nautilus) inelegans, Meek, pl. xxi	232
Articulata.	
Crustacea.	
Prostus, Steininger, 1831	233
P. planimarginatus, Meek, 1871, pl. xxiii, figs. 3 *a*, *b*	233–234
Dalmanites, Barrande, 1852	234
D. ohioensis, Meek, 1871, pl. xxiii, fig. 1	234–236

91.

MEEK, F. B., *and* WORTHEN, A. H. Paleontology. Descriptions of Invertebrates from the Carboniferous System. <Geological Survey of Illinois, vol. v, pp. 323–619, pls. i–xxxii. 1873. Springfield, 1873.

Published by authority of the legislature of Illinois, 1873.
Genera Physetocrinus, Nipterocrinus, Codonites.

LOWER CARBONIFEROUS SPECIES.

FOSSILS OF THE BURLINGTON GROUP.

	Page.
Echinodermata	323
Notes on the structure and habits of the Palæozoic Crinoidea	323
Synbathocrinus, Phillips	324
Goniasteroidocrinus, Lyon & Casseday	324–325
Cyathocrinus, Miller	325–327
Convoluted support of the digestive sack in the *Actinocrinidæ*	327–329
Ambulacral canals passing under the vault in the *Actinocrinidæ*	329–330
Actinocrinites, Miller	330–341
Actinocrinites. Section (*a*)	342
A. penicillus, M. & W., 1860, pl. viii, fig. 2	342–343
A. sculptus, Hall, 1858, pl. iv, fig. 2	343
A. deliciatus, M. & W., 1860, pl. viii, fig. 2	343–345
Actinocrinites. Section (*b*)	345
A. longus, M. & W., 1860, pl. viii, fig. 1	345–347
Stretocrinus, M. & W., 1866	347–349
S.? asperrimus, M. & W., 1860, pl. viii, fig. 3	349–351
Subgenus *Physetocrinus*, M. & W	351
S. (Physetocrinus?) asper, M. & W., 1860, pl. vii, fig. 1. Section (*b*), p. 258	351–353
S. ectypus, M. & W., 1860, pl. vii, fig. 5	353–355
S. liratus, Hall, sp., 1860, pl. vii, fig. 2	355–357
S. perumbrosus, Hall, sp., 1860, pl. viii, fig. 4	357–360
S. umbrosus, Hall, sp., 1858, pl. viii, fig. 5	360–362
S. (Physetocrinus) dilatatus, M. & W., 1860, pl. x, fig. 6	362–364
Batocrinus, Casseday	364–368
B. quasillus, M. & W., 1860, pl. v, fig. 2	368–370
B. (Eretmocrinus) remibrachiatus, Hall's sp., 1861, pl. x, fig. 5	370
B. cassedayanus, M. & W., 1860, pl. v, fig. 1	370–372
B. trochiscus, M. & W., 1860, pl. v, fig. 6	372–374
B. pyriformis, Shumard sp., 1855, pl. v, fig. 5	375–377
B. (Eretmocrinus?) neglectus, M. & W., 1860, pl. v, fig. 3	377–379
B. christyi, Shumard's sp., pl. v, fig. 4	379

	Page.
B. verneuilianus, Shum. sp., 1855, pl. iv, figs. 3 and 4	379
Doryerinus, Roemer	379–380
D. canaliculatus, M. & W., 1869, pl. vi, fig. 4	381–382
D. unicornis, O. & S., sp., 1850, pl. vi, fig. 2	382
D. roemeri, M. & W., 1868, pl. 10, fig. 3	382–385
D. quinquelobus var. *intermedius*, M. & W., 1868, pl. x, fig. 4	385–386
Amphoracrinus, Austin	386–388
A. divergens, Hall, sp., 1860, pl. vi, fig. 6	386–389
A.? spinobrachiatus, Hall, sp., 1860, pl. vi, fig. 5	389
Gilbertsocrinus, Phillips	389
Subgenus *Goniasteroidocrinus*, Lyon & Casseday, 1859	389
G. (Goniasteroidocrinus) tenuiradiatus, M. & W., 1869, pl. xi, fig. 1	389–390
G. (Goniasteroidocrinus) obovatus, M. & W., 1868, pl. iv, fig. 6	391–392
Megistocrinus, O. & S., 1850	393–396
M. parvirostris, M. & W., 1869, pl. vi, fig. 7	396–397
M. (Saccocrinus) whitei, Hall, 1861, pl. vi, fig. 1	397
Agaricocrinus, Troost	397
A. nodosus, M. & W., 1869, pl. x, fig. 7	397–399
Taxocrinus, Phillips, 1843	399
T. thiemei, Hall, sp., 1861, pl. iv, fig. 1	399
Cyathocrinites, Miller, 1821	400–401
C. sculptilis, Hall, pl. iv, fig. 5	401
C. fragilis, M. & W., 1868, pl. ii, fig. 14	401–403
C. tenuidactylus, M. & W., 1868, pl. ii, fig. 15	403–405
Poteriocrinites, Miller	405
P.? perplexus, M. & W., 1869, pl. ii, fig. 12	406–406
Scaphiocrinus, Hall	407
S. delicatus, M. & W., 1869, pl. i, fig. 5	407–408
S. clio, M. & W., 1869, pl. i, fig. 10	408–409
S. notabilis, M. & W., 1869, pl. i, fig. 9	410–412
S. rudis, M. & W., 1869, pl. i, fig. 1	412–413
S. penicillus, M. & W., 1869, pl. ii, fig. 7	414–415
S. macrodactylus, M. & W., 1869, pl. ii, fig. 9	415–416
S. juvenis, M. & W., 1869, pl. ii, fig. 8	417–418
S. striatus, M. & W., 1869, pl. ii, fig. 11	418–419
S. tethys, M. & W., 1869, pl. ii, fig. 13	419–421
S. scalaris, M. & W., 1869, pl. ii, fig. 10	421–423
S. nanus, M. & W., 1869, pl. i, fig. 8	423–424
S. fascellus, M. & W., 1869, pl. i, fig. 3	424–426
Subgenus *Zeacrinus*	426
S. (Zeacrinus) scobina, M. & W., 1869, pl. i, fig. 2	426–428
S. (Zeacrinus) serratus, M. & W., 1869, pl. i, fig. 6	428–430
S. (Zeacrinus) asper, M. & W., 1869, pl. i, fig. 7	430–432
S. (Zeacrinus) lyra, M. & W., 1869, pl. i, fig. 11	432–433
Nipterocrinus, Wachsmuth	434–435
N. wachsmuthi, M. & W., 1868, pl. ii, fig. 4	435–436
N. arboreus, Worthen MSS., pl. iv, fig. 8	436–437
Synbathocrinus, Phillips, 1836	437
S. wachsmuthi, M. & W., 1869, pl. ii, fig. 5	437–439
S. brevis, M. & W., 1869, pl. ii, fig. 6	439
Dichocrinus, Munster, 1839	440
D. lineatus, M. & W., 1869, pl. iii, fig. 1	440–441
D. pisum, M. & W., 1869, pl. iii, fig. 2	441–442
Calceocrinus, Hall, 1852	442–443
C.? wachsmuthi, M. & W., 1869, pl. ii, fig. 1	444–445
Erisocrinus, M. & W., 1865	445–447
E. antiquus, M. & W., 1869, pl. ii, fig. 3	447–448
E. whitei, M. & W., 1869, pl. ii, fig. 2	448–449
Platycrinites, Miller	450
P. tenuibrachiatus, M. & W., 1869, pl. iii, fig. 4	450–452
P. planus, O. & S., 1852, pl. iii, fig. 5	452
P. subspinosus, Hall, 1858, pl. ii, fig. 2	453
P. burlingtonensis, O. & S., 1850, pl. iii, fig. 6	453–454
P. halli, Shumard? 1866, pl. iii, fig. 3	454–456
P. æqualis, Hall, 1861, pl. iii, fig. 8	456–458

Page.
P. incomptus, White, 1863, pl. iii, fig. 7 459–461
Pentremites, Say 461
P. burlingtonensis, M. & W., 1869, pl. viii, fig. 7 461–462
Codonites, M. & W., 1869 463–464
C. stelliformis, O. & S., sp., 1850, pl. ix, fig. 5, 5a, b 464–466
C. gracilis, n. s., M. & W., 1873, pl. viii, fig. 6 466–468
Granatocrinus, Troost 468
G. melonoides, M. & W., 1869, pl. ix, fig. 1 468–470
G. pisum, M. & W., 1869, pl. ix, fig. 4 470–471
G. neglectus, M. & W., 1869, pl. ix, fig. 3 471–473
G. norwoodi, O. & S., sp., 1850, pl. ix, fig. 2 473
Palæchinus, McCoy 473
P. gracilis, M. & W., 1869, pl. x, fig. 2 473–474
Onychaster, M. & W 474–475
O. barrisi, Hall, sp., 1861, pl. x, fig. 1 476
Oligoporus, Meek & Worthen 476
O. nobilis, M. & W., 1868, pl. xi, fig. 3 476–478
Eocidaris 478
E.? squamosus, M. & W., 1869, pl. ix, fig. 15 478–482

FOSSILS OF THE KEOKUK GROUP.

Barycrinus, Wachs. 483
B. magnificus, M. & W., 1868, pl. xii, fig. 2 483–485
B. geometricus, M. & W., pl. xii, fig. 3 485
B. hoveyi, var. *hurculeus*, M. & W., 1868, pl. xiii, fig. 2 485–486
B. hoveyi, Hall, sp., 1861, pl. xiii, fig. 1 486
B. mammatus, Worthen MSS., pl. xv, fig. 4 486
B. pentagonus, Worthen MSS., pl. xv, fig. 3 487
B. subtumidus, M. & W., pl. xiii, fig. 3 487–488
Cyathocrinites? poterium, M. & W., 1870, pl. xii, fig. 4 489–490
Poteriocrinites 490
P. (Zeacrinus?) concinnus, M. & W., 1870, pl. xiv, fig. 3 490–492
Subgenus *Scaphiocrinus* 492
P. (Scaphiocrinus) depressus, M. & W., 1870, pl. xiv, fig. 8 492–493
P. (Scaphiocrinus) unicus, Hall, 1861, pl. xv, fig. 5 493
P. (Scaphiocrinus) æqualis, Hall, 1861, pl. xv, fig. 6 494
P. (Scaphiocrinus) coreyi, M. & W., 1869, pl. xv, fig. 1 494–495
P. (Scaphiocrinus) meadamsi, Worthen MSS., pl. xv, fig. 2 495–496
Forbesiocrinus worthenî, Hall, 1858, pl. xiv, fig. 2, and pl. xv, fig. 7 496–498
Onychocrinus exculptus, L. & C., 1859, pl. xiv, fig, 4 498
Agaricocrinus, Troost 499
A. whitfieldi, Hall, 1868, pl. xii, figs. 1 *a*, *b*, and pl. xv, fig. 8 499–500
Dichocrinus, Munster 500
D. expansus, M. & W., 1868, pl. xiv, fig. 1 500–502
D. ficus, C. & L., 1860, pl. xiv, fig. 5 502
Calceocrinus, Hall 502
C. bradleyi, M. & W., 1869, pl. xiv, fig. 9 502–504
Catillocrinus, Troost 504
C. bradleyi; M. & W., 1868, pl. xiv, fig. 10 504–505
Platycrinites 506
P. hemisphericus, M. & W., 1865, pl. xvi, figs. 6 *a–c* 506
Pentremites 506
P. worthenî, Hall? 1858, pl. xiv, fig. 11 506
P. (Troostocrinus?) woodmani, M. & W., 1868, pl. xvi, fig. 4 506–508
Granatocrinus 508
G. granulosus, M. & W., 1865, pl. xv, fig. 10 508–509
Protaster, Forbes 509
P.? gregarius, M. & W., 1869, pl. xvi, fig. 5 509–510
Onychaster, M. & W 510
O. flexilis, M. & W., pl. xvi, fig. 3 510
Pholidocidaris, M. & W., 1869 510–511
P. irregularis, M. & W., 1869, pl. xv, fig. 9 510–511
Agelacrinites, Vanuxem ..... [illegible]
A. (Lepidodiscus) squamosus, M. & W., 1868, pl. xvi, fig. 1

Mollusca.
Gasteropoda.
Platyceras, Conrad
P. uncum, M. & W., 1866, pl. xvii, fig. 1 5
P. infundibulum, M. & W., 1866, pl. xvii, fig. 3 5
P. equilatera, Hall, 1860, pl. xvii, fig. 2 5
P. fissurella, Hall, 1859, pl. xvii, fig. 4 5
Pteropoda.
Conularia.
Conularia subcarbonaria, M. & W., 1865, pl. xix, fig. 4 5
Cephalopoda.
Nautilus, Linn
N. (Discites) disciformis, M. & W., 1865, pl. xviii, fig. 1 5
N. (Temnocheilus) niotensis, M. & W., 1865, pl. xix, fig. 3 5
N. (Solenocheilus) leidyi, M. & W., 1865, pl. xviii, fig. 2 5
Articulata.
Phillipsia, Portlock
P. (Griffithides) portlockii, M. & W., 1865, pl. xix, fig. 6 5
P. (Griffithides) bufo, M. & W., 1870, pl. xv, fig. 10 5

FOSSILS OF THE SAINT LOUIS GROUP.

Echinodermata.
Barycrinus
B. spectabilis, M. & W., 1869, pl. xx, fig. 8 5
Poteriocrinites
P. hardinensis, Worthen MSS., pl. xx, fig. 10
Subgenus *Scaphiocrinus*
P. (Scaphiocrinus) huntsvillæ, Worthen MSS., pl. xx, fig. 1
Subgenus *Zeacrinus*
P. (Zeacrinus) arboreus, Worthen MSS., pl. xx, fig. 5 5
P. (Zeacrinus) cariniferous, Worthen MSS., pl. xx, fig. 4 5
P. (Zeacrinus) compactilis, Worthen MSS., pl. xxi, fig. 5 5
Dichocrinus, Munster
D. cornigerus, Shumard ? 1860, pl. xx, fig. 6
Granatocrinus
G. glaber, M. & W., 1869, pl. xx, fig. 11 5
Mollusca.
Lamellibranchiata.
Lithophaga ? pertenuis, M. & W., 1865, pl. xxii, fig. 1 5
Myalina
M. St. ludovici, Worthen MSS., pl. xxii, fig. 3
Chænomya, M. &. W
C. ? rhomboidea, M. & W., 1865, pl. xxii, fig. 4 5
Pteropoda.
Conularia
C. missouriensis, Swallow ? 1860, pl. xxii, fig. 5 5
Cephalopoda.
Nautilus
N. (Temnocheilus) coxanus, M. & W., 1869, pl. xxiii, fig. 1 5
N. (Solenocheilus) collectus, M. &. W., 1870, pl. xxiii, figs. 3 and 4 5

FOSSILS OF THE CHESTER GROUP.

Echinodermata.
Poteriocrinites
P. bisselli, Worthen MSS., pl. xxi, fig. 4 5
Subgenus *Zeacrinus*
P. (Zeacrinus ?) armiger, M. & W., 1870, pl. xxi, fig. 3 5
P. (Zeacrinus) subtumidus, Worthen MSS., pl. xxi, fig. 1 5
P. (Zeacrinus) formosus, Worthen MSS., pl. xxi, fig. 2
Subgenus *Scaphiocrinus*
P. (Scaphiocrinus) bayensis, M. & W., 1865, pl. xx, fig. 2 5
P. (Scaphiocrinus) randolphensis, Worthen MSS., pl. xxi, fig. 14 5
Onychocrinus
O. whitfieldi, Hall sp., 1858, pl. xx, fig. 3 5
Eupachycrinus

Page

E. boydii, M. & W., 1870, pl. xxi, fig. 6 554–555
Platycrinites 555
P. parvulus, M. & W., 1865, pl. xx, fig. 7 555–556
Agassizocrinus 556
A. pentagonus, Worthen MSS., pl. xxi, fig. 10 556–557
A. conicus, O. & S., 1851, pl. xxi, fig. 8 557
A. gibbosus, Worthen MSS., pl. xxi, fig. 12 557–558
A. gibbosus, Hall, 1858, pl. xxi, fig. 11 558
A. chesterensis, Worthen MSS., pl. xxi, fig. 9 558
Pterotocrinus, L. & C 559
P. depressus, L. & C.? 1860, pl. xxi, fig. 13 559
Graphiocrinus 559
G. dactylus, Hall, 1860, pl. xx, fig. 9 559

FOSSILS OF THE COAL-MEASURES.

Foraminifera.
Fusulina, Fischer 560
F. gracilis, Meek ? 1864, pl. xxiv, fig. 7 560
F. ventricosa, M. & H., 1864, pl. xxiv, fig. 8 560
Radiata.
Lophophyllum, Edwards & Haime 560
L. proliferum, McC. sp., 1860, pl. xxiv, fig. 1 560
Erisocrinus 561
E. typus, M. & W., 1865, pl. xxiv, fig. 6 561
Poteriocrinites 561
P. macoupinensis, Worthen MSS., pl. xxiv, fig. 3 561
Subgenus *Scaphiocrinus* 561
P. (Scaphiocrinus?) hemisphericus, Shum. sp., 1858, pl. xxiv, fig. 5 561
P. (Scaphiocrinus) carbonarius, M. & W., 1861, pl. xxiv, fig. 2 562
Subgenus *Zeacrinus* 563
P. (Zeacrinus?) mucrospinus, McC., 1859, pl. xxiv, fig. 12 563
P. (Zeacrinus [Hydreionocrinus?]) acanthophorus, M. & W., 1870, pl. xxiv, fig. 11 .. 563–565
Eupachycrinus 565
E. fayettensis, Worthen MSS., pl. xxiv, fig. 10 565–566
E. tuberculatus, M. & W., 1866, pl. xxiv, fig. 9 566
Agassizocrinus carbonarius, Worthen MSS., pl. xxiv, fig. 4 566
Molluscs.
Brachipoda.
Chonetes, Fischer 566
C. millepunctata, M. & W., 1870, pl. xxv, fig. 3 566–569
Productus, Sowerby 569
P. nebrascensis, Owen, 1852, pl. xxv, fig. 8 569
P. longispinus, Sowerby ? 1814, pl. xxv, fig. 10 569
P. punctatus, Martin, 1809, pl. xxv, fig. 13 569
P. laeallensis, Worthen MSS., pl. xxv, fig. 9 569–570
Chonetes smithii, N. & P., 1855, pl. xxv, fig. 11 570
Hemipronites, Pander 570
H. crassus, M. & W., 1858, pl. xxv, fig. 12 570
Athyris, McCoy 570
A. subtilita, Hall's sp., pl. xxv, fig. 14 571
Syntrielasma, M. & W 571
S. hemiplicata, Hall's sp., 1852, pl. xxvi, fig. 20 571
Meekella, White & St. John 571
M. striato-costata, Cox sp., 1857, pl. xxvi, fig. 21 571
Rhynchonella, Fischer 571
R. osagensis, Swallow, 1858, pl. xxvi, fig. 22 571
Orthis, Dalman 571
O. carbonaria, Swallow 571
Terebratula, Llhwyd 572
T. bovidens, Morton, 1836, pl. xxv, fig. 15 572
Discina, Lamarck, 1819 572
D. nitida, Phillips sp. ? pl. xxv, fig. 1 572
Lingula, Bruguière, 1789 .....
L. mytiloides, Sowerby ? 1813, pl. xxv, fig. 2 .....
Spirifer fultonensis, Worthen, MSS. pl. xxv, fig. 5 .....
Spirifer cameratus, Morton, pl. xxv, fig. 7 .....

Lamellibranchiata.
Monotis .....
M.? gregaria, M. & W., 1870, pl. xxvi, fig. 5 5
Macrodon, Lycett .....
M.? delicatus, M. & W., 1870, pl. xxvi, fig. 3 .....
M.? tenuistriatus, M. & W., 1867, pl. xxvi, fig. 4 .....
Avicula .....
A. morganensis, M. & W., 1866, pl. xxvi, fig. 14 57
A. longa, Geinitz sp., 1866, pl. xxvi, fig. 1 .....
Placunopsis .....
P. carbonaria, M. & W., 1866, pl. xxvii, fig. 2 578
Schizodus, King .....
S. amplus, M. & W., 1870, pl. xxvii, fig. 6 579
S. (Prisconia) perelegans, M. & W., 1870, pl. xxvi, fig. 19 .....
S. curtus, M. & W., 1866, pl. xxvi, fig. 16 .....
Myalina, de Koninck .....
M. perattenuata, M. & W., 1858, pl. xxvi, fig. 11 .....
Edmondia .....
E.? peroblonga, M. & W., 1866, pl. xxvii, fig. 4 583
Clinopistha, M. & W .....
C. radiata, var. *levis*, M. & W., 1870, pl. xxvii, fig. 7 584
Allorisma, King .....
A. costata, M. & W., 1869, pl. xxvi, fig. 15 585
A. geinitzii, Meek, 1867, pl. xxvi, fig. 23 .....
Chænocardia, M. & W .....
C. ovata, M. & W., 1869, pl. xxvii, fig. 5 586
Chænomya, M. & W .....
C. minnehaha, Swallow sp., 1858, pl. xxvii, fig. 3 .....
Cardiomorpha .....
C. missouriensis, Shum., 1860, pl. xxvii, fig. 8 .....
Entolium, Meek .....
E. aviculatum, Swallow sp., 1858, pl. xxvi, fig. 12 .....
Lima, Bruguière .....
L. retifera, Shum., 1858, pl. xxvi, fig. 2 .....
Aviculopecten neglectus, Geinitz sp., 1866, pl. xxvi, fig. 7 .....
Pleurophorus, King .....
P. oblongus, Meek? 1872, pl. xxvi, fig. 6 .....
Nucula, Lamarck .....
N. parva, McC., 1860, pl. xxvi, fig. 8 .....
N. beyrichi, v. Schauroth, 1854, pl. xxvi, fig. 9 .....
Gasteropoda.

	Page.
Anomphalus, M. & W	597
A. rotulus, M. & W., 1866, pl. xxix, fig. 10	597
Microdoma, M. & W	598
M. conica, M. & W., 1866, pl. xxviii, fig. 2	598
Murchisonia inornata, M. & W., 1866, pl. xxviii, fig. 6	599–600
Pleurotomaria coxana, M. & W., 1866, pl. xxviii, fig. 15	600
Pleurotomaria spironema, M. & W., 1866, pl. xxviii, fig. 5	601–602
Pleurotomaria valvatiformis, M. & W., 1866, pl. xxix, fig. 9	602–603
Pleurotomaria conoides, M. & W., 1866, pl. xxviii, fig. 1	603–604
Straparollus, Montfort	604
S. (Euomphalus) pernodosus, M. & W., 1870, pl. xxix, fig. 14	604–605
S. (Euomphalus) subquadratus, M. & W., 1870, pl. xxix, figs. 12 and 13	605–607
S. (Euomphalus) subrugosus, M. & W., pl. xxix, fig. 11	607
Chiton, Linnæus	608
C. carbonarius, Stevens, 1859, pl. xxix, fig. 15	608
Cephalopoda.	
Nautilus (Temnocheilus) latus, M. & W., 1870, pl. xxx, fig. 2	608–609
N. (Temnocheilus) winslowi, M. & W., 1870, pl. xxxii, fig. 2	609–610
N. lasallensis, M. & W., 1866, pl. xxxi, fig. 1	610–611
Goniatites compactus, M. & W., 1865, pl. xxxi, fig. 2	611–612
Orthoceras	612
O. rushensis, McC.? 1860, pl. xxx, fig. 4	612
Articulata.	
Phillipsia, Portlock	612
P. (Griffithides) scitula, M. & W., 1865, pl. xxxii, fig. 3	612–615
P. (Griffithides?) sangamonensis, M. & W., 1865, pl. xxxii, fig. 4	615–618
Dithyrocaris, Scouler	618
D. carbonarius, M. & W., 1869, pl. xxxii, fig. 1	618–619

92.

Meek, F. B. Notes on some of the Fossils figured in the recently issued Fifth volume of the Illinois State Geological Report. <Am. Jour. Sci., vol. vii, 3d ser., pp. 189–193; continued on pp. 369–376 and 484–490 and 580–584. 1874. New Haven, 1874.

In this series of articles Mr. Meek revises and extends the descriptions of a large number of the species embraced in the fifth volume of Illinois Geological Report, and also presents some very important philosophical discussions of the relations of the species and of the higher groups.

	Page.
Actinocrinites sculptilis, Hall	190–191
Tazocrinus thiemei, Hall	191–192
Batocrinus pyriformis, Shumard	192
Actinocrinites delicatus, M. & W	192–193
Actinocrinites Cyathocrinites, Codonites, etc	369–374
Codonites stelliformis	374–375
Pholidocidaris irregularis, M. & W	375
Pentremites (Troostocrinus?) woodmani, M. & W	375–376
Agassizocrinus, Troost	484
Fusulina gracilis	484
Fusulina ventricosa	484
Zeacrinus (Hydreionocrinus?) acanthophorus, M. & W	485–486
Archæocidaris?, sp. undt	486
Septopora cestriensis, Prout	486–488
Synocladia virgulacea var. *biserialis*, Swallow	486–488
Aviculopecten neglectus, Geinitz	488–489
Aviculopecten carboniferus, Stevens sp	489
Nuculana, sp. undt., Meek, 1874	489–490
Edmondia ovata,	580
Schizodus rossicus, de Verneuil	580–580
Solenomya sp. undt., Meek, 1874	582–583
Placunopsis carbonaria, M. & W	583
Anomphalus rotulus, M. & W	583
Euomphalus rugosus, Hall	583–584
Pleurotomaria gurleyi	584

93.

MEEK, F. B. The new genus Euchondria. <Am. Journ. Sci., vol. vii, 3d ser. 445. 1874. New Haven, 1874.

Mr. Meek, in a brief note, proposes the generic name Euchondria, of which the *P. neglectus* of Geinitz is the type.

94.

MEEK, F. B. [Descriptions of] Pleurotomaria taggarti. <Hayden's Ann. Rep. U Geol. and Geog. Surv. of the Terr. for 1873, p. 231, foot-note. Washington, 1

Carboniferous.

Pa

Pleurotomaria taggarti, n. s., Meek, 1874.....

95.

MEEK, F. B. Notes on some fossils from near the eastern base of the Rocky Mou ains, west of Greeley and Evans, Colorado, and others from about two hund miles farther eastward, with descriptions of a few new species. <Bulletin U Geol. and Geog. Surv. of the Terr., 2d ser., No. 1, pp. 39–47. 1875. Washingt 1875.

These fossils are from the Fox Hills and Laramie (Lignitic) Group.

Pa

Anomia micronema, n. s., Meek, 1875.....
Corbicula ? (*Leptesthes*) *planumbona*, n. s., Meek, 1875..... 4
Cyrena ? *holmesi*, n. s., Meek, 1875..... 4
Sphæriola ? *obliqua*, n. s., Meek, 1875.....
Rhynchonella endlichi, n. s., Meek, 1875..... 4

96.

MEEK, F. B. Description of Unios supposed to be of Triassic age. <Ann. Rep. Ge Expls. and Survs. West of the 100th Merid., by G. M. Wheeler, Appendix L the Ann. Rep. Chief of Engineers for 1875, pp. 83, 84. Washington, 1875.

P

Unio cristonensis, n. s., Meek, 1875..... 8
Unio gallinensis, n. s., Meek, 1875.....
Unio terra-rubræ, n. s., Meek, 1875.....

Page.

Brachiopoda.

Lingula, Bruguière, 1792 275
L. (*Lingulella*?) *membranacea*, Winchell, 1863, pl. xiv, fig. 4 275
L. melia, Hall? 1864, pl. xiv, fig. 3 276
L. scotica, Davidson? 1868, pl. xiv, fig. 9 276-277
Discina, Lamarck, 1819 277
Subgenus *Orbiculoidea*, d'Orbigny, 1847 277
D. (*Orbiculoidea*) *newberryi*, Hall, 1864, pl. xiv, figs. 1 *a-d* 277-278
D. (*Orbiculoidea*?) *pleurites*, Meek, n. s., 1875, pl. xiv, figs. 2 *a*, *b* 278-279
Strophomena, Rafinesque, 1827 279
Subgenus *Hemipronites*, Pander, 1830 279
S. (*Hemipronites*) *crenistria*, Phillips? sp., 1836, pl. x, figs. 5 *a-d* 279-283
Productus, Sowerby, 1814 .....
Productus sp., Meek, 1875, pl. x, figs. 4 *a-d* 282-283
Productus sp., Meek, 1875, pl. x, fig. 3 283
Athyris, McCoy, 1844 283
A. lamellosa, Leveille? sp., 1835, pl. xiv, figs. 6 *a*, *b* 283-285
Spirifer, Sowerby, 1815 285
S. carteri, Hall, 1857, pl. xiv, figs. 7 *a-c*, (*d*?) 285-288
Subgenus *Trigonotreta*, King, 1825 289
S. (*Trigonotreta*) *striatiformis*, n. s., Meek, 1875, pl. xiv, figs. 8 *a-e* 289-290
S. (*Trigonotreta*) *biplicatus*, Hall? ? 1858, pl. xiv, fig. 5 290-292

Lamellibranchiata.

Entolium, Meek 292
E. shumardianum Winchell? sp., 1865, pl. xv, figs. 4 *a*, *b* 292-294
Aviculopecten, McCoy, 1851 295
A. crenistriatus, Meek, 1871, pl. xv, figs. 7 *a*, *b* 295-296
A. winchelli n. s., Meek, 1875, pl. xv, figs. 5 *a* and 5 *b*? 296-298
Palæoneilo, Hall, 1870? 298
P. bedfordensis n. s., Meek, 1875, pl. xv, figs. 3 *a-c* 298
Schizodus, King, 1844 299
S. medinæensis, Meek, 1871, pl. xv, figs. 1 *a-c* 299-300
Grammysia, De Verneuil, 1847 300
G.? *hannibalensis*, Shumard sp., 1855, pl. xvi, figs. 5 *a-e* 300-301
G.? *rhomboides*, Meek, 1871, pl. xvi, figs. 7 *a*, *b* 302-303
G. ventricosa, Meek, 1871, pl. xvi, figs. 6 *a*, *b* (and pl. xiii, figs. 5 *a*, *b*, *var.*) 303
Edmondia, De Koninck, 1844 304
E. tapesiformis n. s., Meek, 1875, pl. xiii, fig. 6 304
Cardiomorpha, De Koninck, 1844 304
C. subglobosa n. s., Meek, 1875, pl. xv, figs. 6 *a*, *b* 304-305
Prothyris, Meek, 1869 305
P. meeki, Winchell, MS., 1872, pl. xv, fig. 2 305-306
Sanguinolites, McCoy, 1844 306
S.? *obliquus*, Meek, 1871, pl. xvi, figs. 2 *a*, *b* 306-307
S. æolus, Hall, Whitfield, 1870?, pl. xvi, figs. 1 *a-c* 307-308
Promacrus, Meek, 1871 308
P. andrewsi, Meek, 1871, pl. xvii, figs. 1 *a*, *b* 308-309
Allorisma, King, 1844 309
A. (*Cercomyopsis*) *pleuropistha*, Meek, 1871, pl. xiii, figs. 4 *a-c* 309-311
A. winchelli, Meek, 1871, pl. xvi, figs. 3 *a-c* 311-312
A. ventricosa, Meek, 1871, pl. xvi, figs. 4 *a*, *b* 312-313

Gasteropoda.

Platyceras, Conrad, 1840 313
P. (*Orthonychia*?) *lodiense*, Meek, 1871, pl. xiii, figs. 1 *a*, *b* 313-314
Pleurotomaria, Defrance, 1826 314
P. textiligera, Meek, 1871, pl. xiii, figs. 7 *a*, *b* 314-315

Pteropoda.

Conularia, Miller, 1818 316
C. micronema, Meek, 1871, pl. xviii, figs. 1 *a-d* 316
C. newberryi, Hall, pl. xviii, figs. 2 *a*, *b* 316-317

Crustacea.

Entomostraca.

Ceratiocaris, McCoy 317
?Subgenus *Colpocaris*, Meek, 1872 317
C. (*Colpocaris*) *bradleyi*, Meek, 1872, pl. xviii, figs. 6 *a-e* 318-319

Page.

C. (Colpocaris) elytroides, Meek, 1872, pl. xviii, figs. 5 *a–c* 319-320
Subgenus *Solenocaris*, Meek, 1872 320-321
C. (Solenocaris) strigata, Meek 1872, pl. xviii, figs. 4 *a–c* 321
Tetradecopoda.
? Archæocaris, Meek, 1872 321
A. vermiformis, Meek, 1872, pl. xviii, fig. 7 321-322
Trilobita.
Phillipsia, Portlock, 1843 322
P. (Griffithides ?) lodiensis, n. s., Meek, 1875, pl. xviii, fig. 3 322-325

COAL MEASURE SPECIES.

Molluscoidea.
Polyzoa.
Synocladia, King, 1849 326
S. biserialis, Swallow, 1858, pl. xx, figs. 5 *a, b* 326-327
Ptilodictya, Lonsdale, 1839 327
P. (Stictopora), serrata, n. s., Meek, 1875, pl. xx, fig. 4 327-328
P. (Stictopora) carbonaria, Meek, 1871, pl. xx, figs. 3 *a, b* 328
Brachiopoda.
Spirifer, Sowerby, 1815 329
S. (Trigonotreta) opinus, Hall ? 1858, pl. xix, figs. 14 *a–d* (*c ?*) 329-330
Molluscoidea (Proper).
Lamellibranchiata.
Aviculopecten, McCoy, 1851 330
A. (Streblopteria ?) hertzeri, n. s., Meek, 1875, pl. xix, figs. 13 *a–c* 330-331
Placunopsis, Morris & Lycett, 1853 331
P. recticardinalis, n. s., Meek, 1875, pl. xix, fig. 12 ..... 331-[illegible]
Posidonomya, Brown, 1837 ..... [illegible]
P. fracta, n. s., Meek, 1875, pl. xix, figs. 7 *a, b* ..... [illegible]
Macrodon, Lycett, 1845 ..... [illegible]
M. obsoletus, Meek, 1871, pl. xix, fig. 9 ..... [illegible]
Yoldia, Möller, 1842 ..... [illegible]
Y. stevensoni, Meek, 1871, pl. xix, figs. 4 *a, b* ..... [illegible]
Y. (Palæoneilo ?) carbonaria, Meek, 1871, pl. xix, fig. 5 ..... [illegible]
Schizodus, King, 1844 ..... [illegible]
S. cuneatus, n. s., Meek, 1875, pl. xx, fig. 7 336-337
Aviculopinna americana, Meek, 1867, pl. xx, fig. 2 ..... 337-[illegible]
Pleurophorus, King, 1844 ..... [illegible]
P. tropidophorus, n. s., Meek, 1875, pl. xix, figs. 10 *a, b* 338-339
Solenomya, Lamarck, 1818 339
S. ? anodontoides, n. s., Meek, 1875, pl. xix, fig. 11 339-340
Astartella, Hall, 1858 340
A. newberryi, n. s., Meek, 1875, pl. xix, fig. 3 340-341
A. varica, McChesney, 1860, pl. xix, fig. 2 341
Astartella, sp., Meek, pl. xix, fig. 1 *a, b* 341-342
Cypricardina, Hall, 1860 342
C. ? carbonaria, Meek, 1871, pl. xix, fig. 8 *a, b* 342-343
Allorisma, King, 1844 343
A. costata, M. & W., 1869, pl. xix, figs. 6 *a, b* 344-345
Gasteropoda.
Platyceras, Conrad, 1840 345
P. tortum, Meek, 1871, pl. xx, figs. 1 *a–c* 345
Macrocheilus, Phillips, 1841 346
M. klipparti, Meek, 1872, pl. xx, figs, 6 *a–c* 346-347

99.

MEEK, F. B., *and* A. H. WORTHEN. Paleontology of Illinois. Descriptions of Invertebrates. <Geological Survey of Illinois, vol. vi, section ii, pp. 491–532, plates 23–32. 1875. Springfield, 1875.

Published by authority of the legislature, 1875.

Genus Carbonarca. A portion of these descriptions are by Mr. Worthen alone, and are not mentioned in the following list:

LOWER SILURIAN SPECIES.

	Page.
Echinodermata.	
Homocrinus, Hall	492
H. angustatus, M. & W., 1870, pl. xxiii, fig. 8	492–493
Heterocrinus crassus, M. & W., 1865, pl. xxiii, fig. 1	493
Mollusca.	
Lamellibranchiata.	
Modiolopsis subnasuta, M. & W., 1870, pl. xxiii, figs. 9 *a*, *b*	494–495
Gasteropoda.	
Subulites, Conrad	495
S. inflatus, M. & W., 1860, pl. xxiii, fig. 5	495–496
Articulata.	
Asaphus, Brongniart	497
A. (Isotelus) vigilans, M. & W., 1870, pl. xxiii, fig. 6	497–498

UPPER SILURIAN SPECIES.

Spongia.	
Astylospongia præmorsa, Goldf. ? sp., 1826, pl. xxv, figs. 2, 2 *a*	499
Foraminifera ?	
Receptaculites, Defrance	500
R. formosus, M. & W., 1870, pl. xxiv, fig. 1	500
Brachiopoda.	
Strickiandinia, Billings	502
S. deformis, M. & W., 1870, pl. xxiv, figs. 5 *a*, *b*	502–503
Cephalopoda.	
Orthoceras, Auct	503
O. crebristriatum, M. & W., 1865, pl. xxvi, fig. 2	503–504
O. medullare, Hall ? 1860, pl. xxvi, fig. 1	504
O. *angulatum*, Wahl, 1827, pl. xxiv, fig. 8	504
O. jolietensis, M. & W., 1865, pl. xxvi, fig. 5	505
Cyrtoceras, Goldfuss	506
C. dardanus, Hall ? 1861, pl. xxv, fig. 6	506
Lituites, Breyn	507
L. graftonensis, M. & W., 1860, pl. xxv, fig. 1	507–508
Crustacea.	
Lichas, Dalman	508
L. boltoni, Bigsby, sp., 1825, pl. xxv, fig. 5	508
Illaenus, Dalman	508
I. (Bumastus) graftonensis, M. & W., 1860, pl. xxv, fig. 4	508–510
Sphærexochus, Beyrich	510
S. romingeri, Hall, 1862, pl. xxiv, fig. 4	510
Mollusca.	
Cephalopoda.	
Phragmoceras	511
P. walshii, M. & W., 1866, pl. xxviii, figs. 2 *a*, *b*	511–512
Orthoceras	512
O. winchelli, M. & W., 1866, pl. xxviii, fig. 1	512–513

LOWER CARBONIFEROUS SPECIES.

Echinodermata.	
Synbathocrinus, Phillips	514
S. robustus, Shumard, 1866, pl. xxix, fig. 4	514
Dichocrinus, Munster	515
D. ficus, Casseday & Lyon, 1860, pl. xxix, fig. 7	515
Poteriocrinus	516
Subgenus *Scaphiocrinus*, Hall	519
P. (Scaphiocrinus) unicus, Hall, 1861, pl. xxix, fig. 1	519
Pentremites, Say	521
P. (Tricoelocrinus), obliquatus Roemer, sp., 1852, pl. xxxi, fig. 4	521
Spirifer, Sowerby	521
S. fastigatus, M. & W., 1870, pl. xxx, fig. 3	521–523
S. neglectus, Hall, 1858, pl. xxx, figs. 2 *a*, and 1 *c*	523
S. suborbicularis, Hall, 1858, pl. xxx, fig. 1	523–524

COAL MEASURE SPECIES.

P

Axophyllum, Edwards & Haime.....
A. rudis, White & St. John, pl. xxxii, figs. 6 *a–c*.....
Conocardium, Brown.....
C. obliquum, M. & W., 1865, pl. xxxiii, fig. 4.....
Pleurophorus? King .....
P.? angulatus. M. & W., 1865, pl. xxxiii, fig. 5..... 82
Carbonarca, Meek & Worthen, 1870.....
C. gibbosa, M. & W., 1876, pl. xxxii, fig. 6.....
Nautilus, Linnæus .....
N. (Cryptoceras) capax, M. & W., 1865, pl. xxxiii, fig. 1.....

100.

MEEK, F. B. Notice of a very large Goniatite from Eastern Kansas (Carboniferc <Bulletin U. S. Geol. and Geog. Surv. of the Terr. No. 6, 2d ser., vol. i, p. Washington, 1875.

The author regards it as at most only a variety of *G. globulosus*, Meek & Worthen, alth attaining so great size.

F

Goniatites globulosus var. *excelsus*, Meek, 1875.....

101.

MEEK, F. B. Descriptions and illustrations of fossils from Vancouver's and S Islands, and other Northwestern localities. <Bulletin U. S. Geol. and G Surv. of the Terr., vol. ii, No. 4, pp. 351–374, 6 plates. 1876. Washington, 1

Carboniferous, Cretaceous, and Tertiary; mostly Cretaceous. A large part of the species braced in this paper were originally described by the author in 1856 in vol. iv of Transact Albany Institute, and are here redescribed with others and illustrated.

CARBONIFEROUS SPECIES.

Brachiopoda. P

Productus, Sowerby.....
P. latissimus, Sowerby, 1822, pl. i, fig. 1..... 354
Spirifer, Sowerby .....
S. keokuk, Hall? 1858, pl. i, figs. 3 and 3 *a*.....
Athyris, McCoy, 1844.....
A. subtilita, Hall, sp., 1852, pl. i, figs. 2 and 2 *a*..... 356

CRETACEOUS SPECIES.

Lamellibranchiata. P

Nucula, Lamarck .....
N. traskana, Meek, 1857.....
Grammatodon, Meek.....
G.? vancouverensis, Meek, 1857, pl. iii. figs. 5 and 5 *a* 35
Arca, Sim.....
A.? equilateralis, Meek, 1857, pl. ii, figs. 6, 6 *a*.....
Inoceramus, Sowerby .....
I. cripsii? var. *subundatus*, Meek, 1861, pl. iii, figs. 1, 1 *a* and 3, 3 *a* 35
I. barabini, Morton, 1834, fig. — .....
Inoceramus ——?, pl. i, fig. 6 .....
Trigonia, Bruguière.....
T. evansi, Meek, 1857, pl. ii, figs. 7 *a*, *b* 35
Protocardia, Beyrich.....
P. scitula, Meek, 1857, pl. iii, figs. 4 and 4 *a* 36
Cyprimeria, Conrad.....
C.? tenuis, Meek, 1861, pl. ii, figs. 5 *a*, *b* .....
Pholadomya, Sowerby .....
P. subelongata, Meek, 1857, pl. ii, figs. 1 *a*.....
Goniomya, Agassiz .....
G. borealis, Meek, 1857, pl. ii, fig. 2 36
Thracia, Leach.....
T.? occidentalis, Meek, 1857, pl. ii, figs. 3 *a*.....
T.? subtruncata, Meek, 1857, pl. ii, figs. 4 and 4 *a*..... 36

Page.
Gasteropoda.
Dentalium, Linnæus 364
D. komookense, Meek, 1857, pl. iii, fig. 6 364
Cephalopoda.
Baculites, Lamarck 364
B. chicoensis, Trask ? 1856, pl. iv, figs. 2 *a–c* 364–365
B. occidentalis, Meek, 1861, pl. iv, figs. 1 *a–b* 366–367
Heteroceras, d'Orbigny 367
H. cooperi, Gabb sp., 1864, pl. iii, figs. 7 *a* 367
Ammonites, Bruguière 367
A. newberryanus, Meek, 1857, pl. iv, figs. 3 *a, b* 367–368
A. complexus var. *inciensis*, Meek, 1861, pl. v, figs. 2 *a–c* 369–370
Placenticeras, Meek 370
P.? vancouverense, Meek, 1861, pl. vi, figs. 1 *a–c* 370–371
Phylloceras, Suess 371
P.? ramosus, Meek, 1857, pl. v, figs. 1 *a–b* 371–373
Nautilus, Linnæus 373
N. campbelli, Meek, 1861, pl. vi, figs. 2, 2 *a* 373

TERTIARY SPECIES.?

Mactra, Linnæus 374
M. gibbsana, Meek, 1861, pl. ii, figs. 8 *a–b* 374

102.

tk, F. B. Note on the new genus Uintacrinus, Grinnell. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. ii, No. 4, pp. 375–378, 2 wood cuts. 1876. Washington, 1876.

This paper consists largely of a redescription and rectification of the genus.

Page.
Uintacrinus, n. g., Grinnell, 1876 375–378
U. socialis, n. s., Grinnell, 1876 ?, figs. A, B, p. 375 375

103.

K, F. B. Descriptions of the Cretaceous Fossils collected on the San Juan exploring expedition under Capt. J. N. Macomb, U. S. Engineers. <Report of the Exploring Expedition from Santa Fé, New Mexico, to the junction of the Grand and Green rivers of the Great Colorado of the West, in 1859, pp. 121–133, pls. i and ii. Washington, 1876.

The exploration was made in 1859, but the report was not published until 1876, when Mr. Meek revised the work in accordance with his views at the time of publication.

Lamellibranchiata. Page.
Ostrea, Linnæus 123
O. lugubris, Conrad, 1857, pl. i, figs. 1 *a–d* 123–124
O. (Gryphæa?) uniformis, n. s., Meek, 1876, pl. i, figs. 2 *a–c* 124
Exogyra, Say 124
E. columbella, n. s., Meek, 1876, pl. i, figs. 3 *a–d* 124–125
Anomia, Linnæus 125
A. nitida, n. s., Meek, 1876, pl. i, figs. 4 *a–b* 125
Ostrotina, d'Orbigny 126
O. (Requienia?) bicornis, Meek, 1876, pl. i, figs. 7 *a–b* 126
Plicatula, Lamarck 126
P. arenaria, n. s., Meek, 1876, pl. i, figs. 5 *a–c* 126–127
Inoceramus, Sowerby 127
I. fragilis, H. & M., 1856 ?, pl. i, fig. 6 127
Crassatella, Lamarck 127
C. shumardi, n. s., Meek, 1876, pl. ii, figs. 7 *a–c* 127–128
Cyprimeria, Conrad 128
C.? crassa, n. s., Meek, 1876, pl. i, figs. 8 *a–d* 128
Cardium, Linnæus .....
C. bellulum, n. s., Meek, 1876, pl. ii, figs. 6 *a, b* .....

P

Gasteropoda.
Actæon, Montfort .....
A. intercalaris, n. s., Meek, 1876, pl. ii, figs. 4 *a–c* .....
Anchura, Conrad .....
A.? newberryi, n. s., Meek, 1876, pl. ii, fig. 5 121
Cephalopoda.
Baculites, Lamarck .....
B. anceps var. *obtusus*, Meek, 1876, pl. ii, figs. 1 *a–b* 120
Prionocyclus, Meek .....
P.? macombi, n. s., Meek, 1876, pl. ii, figs. 3 *a–d* 122

104.

MEEK, F. B. Report on the Paleontological collections of the expedition, <Rep
Expl. Great Basin of the Terr. of Utah, in 1859. By J. H. Simpson. Appen
J, pp. 337–373, pls. i–v. Washington, 1876.

Devonian, Carboniferous, Jurassic, Cretaceous, and Tertiary. The explanations were m
and the fossils collected nearly eighteen years before the publication of this report, but
paleontology was corrected in accordance with the views of the author at the time of publicati

Descriptions of new species.

DEVONIAN FOSSILS.

Mollusca.
Brachiopoda. Pa
Productus, Sowerby .....
P. subaculeatus, Murchison? 1840, pl. i, figs. 3 *a–c* .....
Spirifer, Sowerby .....
S. utahensis, Meek, 1860, pl. i, figs. 4 *a–c* 345
S. engelmanni, Meek, 1860, pl. i, figs. 1 *a–c* 346
S. strigosus, Meek, 1860, pl. i, figs. 5 *a–d* .....
Atrypa, Dalman .....
A. reticularis (Lin.) Dalm., 1767, pl. i, figs. 6 *a–b* 347
A. aspera, Schloth, 1813, pl. i, figs. 2 *a–b* .....

CARBONIFEROUS FOSSILS.

Mollusca.
Polyzoa.
Archimedipora, D'Orbigny .....
Archimedipora, ——? Meek, pl. i, fig. 11 .....
Brachiopoda.
Chonetes, Fischer .....

	Page.
O. engelmanni, Meek, 1860, pl. iii, fig. 6	355-356
Gryphæa calceola, Quenstedt? 1856, pl. iii, fig. 2	356
Camptonectes, Agassiz	356
C. bellistriata, Meek, 1869, pl. iii, figs. 3 *a–d*	356-357
Gasteropoda.	
Dentalium, Linn	357
D.? subquadratum, Meek, 1860, pl. iii, figs. 1 *a–c*	357
Cephalopoda.	
Belemnites, Lamarck	358
B. densus, M. & H., 1856, pl. iii, figs. 4 *a, b*	358
CRETACEOUS FOSSILS.	
Lamellibranchiata.	
Inoceramus, Sowerby	358
I. problematicus, Schloth., 1820, pl. iv, figs. 1 *a* and 1 *b, c* (?)	358-359
Anomia, Linn	359
A. concentrica, Meek, 1860, pl. iv, fig. 3	359
Inoceramus simpsoni, Meek, 1860, pl. iv, fig. 4	360
BEAR RIVER FRESH-WATER OR ESTUARY BEDS.	
Mollusca.	
Lamellibranchiata.	
Unio, Retzius	361
U. vetustus, Meek, 1860, pl. v, figs. 12 *a, b*	361
Corbula, Bruguière	361
C. (Anisorhynchus) pyriformis, Meek, 1860, pl. v, figs. 9 and 10	361-362
C. engelmanni, Meek, 1860, pl. v, figs. 13 *a, b*	362
Gasteropoda.	
Pyrgulifera, 1871, Meek	363
P. humerosa, Meek, 1860, pl. v, figs. 6 *a–c*	363
Limnæa nitidula, Meek, 1860, pl. v, fig. 14	363-364
Rhytophorus	364
R. priscus, Meek, 1860, pl. v, figs. 4 *a, b*	364
TERTIARY FOSSILS.	
Mollusca.	
Lamellibranchiata.	
Unio, Retzius	364
U. haydeni, Meek, 1860, pl. v, figs. 11 *a, b*	364-365
Goniobasis, Lea	365
G. simpsoni, Meek, 1860, pl. v, figs. 1 *a–c*	365-366
G. arcta, Meek, 1860, pl. v, fig. 5	366
Planorbis, Müller	366
P. spectabilis, Meek, 1860, pl. v, figs. 7 *a–d*	366-367
P. spectabilis var. *utahensis*, Meek, 1860, pl. v, figs. 8 *a–c*	367
Limnæa vetusta, Meek, 1860, pl. v, figs. 3 *a, b*	367
L. similis, Meek, 1860, pl. v, figs. 2 *a, b*	367
Catalogue of the organic remains contained in the collection	368-373
Devonian species	368
Carboniferous species	368-371
Permian forms	371-372
Jurassic species	372
Cretaceous species	372-373
Fossils of the Bear River Fresh or Brackish water beds	373
Tertiary species	373

105.

MEEK, F. B. A report on the Invertebrate Cretaceous and Tertiary Fossils of the Upper Missouri Country. <Rep. U. S. Geol. & Geogr. Surv. of the Terr. 4°. vol. ix, pp. i–xiv, 1–629, pls. i–xlv. Washington, 1876.

This great work contains descriptions and illustrations of nearly 300 species; more than 200 genera and subgenera are fully diagnosed, besides which full diagnoses of the families which embrace them are given; also philosophical discussion of many important questions. The greater part of the species embraced in this volume were previously, from time to time, described and published, mainly in the publications of the Acad. Nat. Sc. Phila.

Gasteropoda.
Actæon, Montfort
A. intercalaris, n. s., Meek, 1876, pl. ii, figs. 4 *a–c*
Anchura, Conrad
A.? newberryi, n. s., Meek, 1876, pl. ii, fig. 5
Cephalopoda.
Baculites, Lamarck
B. anceps var. *obtusus*, Meek, 1876, pl. ii, figs. 1 *a–h*
Prionocyclus, Meek
P.? macombi, n. s., Meek, 1876, pl. ii, figs. 3 *a–d*

104.

MEEK, F. B. Report on the Paleontological collections of the expedition, <Re
Expl. Great Basin of the Terr. of Utah, in 1859. By J. H. Simpson. Appe
J, pp. 337–373, pls. i–v. Washington, 1876.

Devonian, Carboniferous, Jurassic, Cretaceous, and Tertiary. The explanations were
and the fossils collected nearly eighteen years before the publication of this report, bu
paleontology was corrected in accordance with the views of the author at the time of publica

Descriptions of new species.

DEVONIAN FOSSILS.

Mollusca.
Brachiopoda.
Productus, Sowerby
P. subaculeatus, Murchison? 1840, pl. i, figs. 3 *a–c*
Spirifer, Sowerby
S. utahensis, Meek, 1860, pl. i, figs. 4 *a–c*
S. engelmanni, Meek, 1860, pl. i, figs. 1 *a–c*
S. strigosus, Meek, 1860, pl. i, figs. 5 *a–d*
Atrypa, Dalman
A. reticularis (Lin.) Dalm., 1767, pl. i, figs. 6 *a–b*
A. aspera, Schloth, 1813, pl. i, figs. 2 *a–b*

CARBONIFEROUS FOSSILS.

Mollusca.
Polyzoa.
Archimedipora, D'Orbigny
Archimedipora, ——? Meek, pl. i, fig. 11
Brachiopoda.
Chonetes, Fischer
C. verneuiliana var. *utahensis*, Meek, 1876, pl. ii, figs. 2 *a–c*
Productus, Sowerby
P. semistriatus, Meek, 1860, pl. i, figs. 7 *a–b*
P. multistriatus, Meek, 1860, pl. i, figs. 8 *a–b*
Athyris, McCoy
A. subtilita, Hall, sp., 1852, pl. ii, figs. 4 *a–b*
Spirifer, Sowerby
S. (Spiriferina?) scobina, Meek, 1860, pl. ii, figs. 5 *a–c*
S. (Spiriferina) pulcher, Meek, 1860, pl. ii, figs. 1 *a–h*
S. cameratus, Morton, 1836, pl. ii, figs. 3 *a, b*
Lamellibranchiata.
Aviculopecten, McCoy
A. utahensis, Meek, 1860, pl. i, figs. 9 *a–c*
Cephalopoda.
Orthoceras, Auct.
O. baculum, Meek, 1860, pl. i, figs. 10 *a–b*

JURASSIC SPECIES.

Radiata.
Echinodermata.
Pentacrinites, Miller
Pentacrinites, undt. sp., Meek, pl. iii, figs. 5 *a–c*
Mollusca.
Lamellibranchiata.
Ostrea, Linnæus

	Page.
O. engelmanni, Meek, 1860, pl. iii, fig. 6	355–356
Gryphæa calceola, Quenstedt? 1856, pl. iii, fig. 2	356
Camptonectes, Agassiz	356
C. bellistriata, Meek, 1860, pl. iii, figs. 3 *a–d*	356–357
Gasteropoda.	
Dentalium, Linn	357
D.? subquadratum, Meek, 1860, pl. iii, figs. 1 *a–c*	357
Cephalopoda.	
Belemnites, Lamarck	358
B. densus, M. & H., 1858, pl. iii, figs. 4 *a*, *b*	358
CRETACEOUS FOSSILS.	
Lamellibranchiata.	
Inoceramus, Sowerby	358
I. problematicus, Schloth., 1820, pl. iv, figs. 1 *a* and 1 *b*, *c* (?)	358–359
Anomia, Linn	359
A. concentrica, Meek, 1860, pl. iv, fig. 3	359
Inoceramus simpsoni, Meek, 1860, pl. iv, fig. 4	360
BEAR RIVER FRESH-WATER OR ESTUARY BEDS.	
Mollusca.	
Lamellibranchiata.	
Unio, Retzius	361
U. vetustus, Meek, 1860, pl. v, figs. 12 *a*, *b*	361
Corbula, Bruguière	361
C. (Anisorhynchus) pyriformis, Meek, 1860, pl. v, figs. 9 and 10	361–362
C. engelmanni, Meek, 1860, pl. v, figs. 13 *a*, *b*	362
Gasteropoda.	
Pyrgulifera, 1871, Meek	363
P. humerosa, Meek, 1860, pl. v, figs. 6 *a–c*	360
Limnæa nitidula, Meek, 1860, pl. v, fig. 14	363–364
Rhytophorus	364
R. priscus, Meek, 1860, pl. v, figs. 4 *a*, *b*	364
TERTIARY FOSSILS.	
Mollusca.	
Lamellibranchiata.	
Unio, Retzius	364
U. haydeni, Meek, 1860, pl. v, figs. 11 *a*, *b*	364–365
Goniobasis, Lea	365
G. simpsoni, Meek, 1860, pl. v, figs. 1 *a–c*	365–366
G. arcta, Meek, 1860, pl. v, fig. 5	366
Planorbis, Müller	366
P. spectabilis, Meek, 1860, pl. v, figs. 7 *a–d*	366–367
P. spectabilis var. *utahensis*, Meek, 1860, pl. v, figs. 8 *a–c*	367
Limnæa vetusta, Meek, 1860, pl. v, figs. 3 *a*, *b*	367
L. similis, Meek, 1860, pl. v, figs. 2 *a*, *b*	367
Catalogue of the organic remains contained in the collection	368–373
Devonian species	368
Carboniferous species	368–371
Permian forms	371–372
Jurassic species	372
Cretaceous species	372–373
Fossils of the Bear River Fresh or Brackish water beds	373
Tertiary species	373

105.

EK, F. B. A report on the Invertebrate Cretaceous and Tertiary Fossils of the Upper Missouri Country. <Rep. U. S. Geol. & Geogr. Surv. of the Terr. 4°. Vol. ix, pp. i-xiv, 1-629, pls. i-xlv. Washington, 1876.

This great work contains descriptions and illustrations of nearly 300 species; more than 200 genera and subgenera are fully diagnosed, besides which full diagnoses of the families which embrace them are given; also philosophical discussion of many imp
greater part of the species embraced in this volume we
scribed and published, mainly in the publications of

CONTENTS.

	Page.
List of wood-cuts	xiii
List of errata	xv
Letter of Dr. F. V. Hayden	xvii
Introductory remarks	xix
Cretaceous formation	xxi
Section of Cretaceous formation on the Missouri	xxiii
General section of the Cretaceous rocks of Nebraska	xxiv
Subdivisions of the Upper Missouri undoubted Cretaceous series, and their geographical extension west of the Mississippi, individually considered	xxvi
Dakota group	xxvi
Fort Benton group	xxviii
Niobrara group	xxx
Fort Pierre group	xxxiii
Fox Hills group	xxxv
New Mexican Cretaceous section	xxxvii
Relations of the Upper Missouri Cretaceous beds to those east of the Mississippi	xxxviii
Section of Cretaceous rocks of Mississippi	xxxviii
Alabama section	xxxix
New Jersey section	xli
Parallelism of the subdivisions of the Upper Missouri Cretaceous series with those of the same in Europe	xliii
Fresh and brackish water lignite deposits of the Upper Missouri	xlviii
Judith River group	xlvii
Section of the Judith River group	xlviii
Fort Union group	lv
Section of the Fort Union	lix
Tertiary rocks of the Wind River and White River groups	lxi
Wind River group	lxi
White River group	lxi
Section of the White River group	lxii
Invertebrate palæontology	1
Cretaceous species	1
Species of the fresh and brackish water lignite beds	509
Fossils of the Wind River Tertiary	593
Fossils of the White River Tertiary	598
Appendix	607

CRETACEOUS.

Radiata.	
Polypi.	
Actinaria.	
Fungiidæ.	
Micrabacia, Edwards & Haime, 1849	1
M. americana, M. & H., 1860, pl. xxviii, figs. 1 *a–d*	1-2
Alcyonaria.	
Gorgoniidæ.	
Websteria, Edwards & Haime, 1854	2-3
W. cretacea, Meek, 1864, pl. xxviii, figs. 3 *a–c*	3-4
* *Microstizia*, n. g., Meek, 1876	4
* *M. millepunctata*, n. s., Meek, 1876, pl. xxviii, figs. 2 *a–c*	4
Echinodermata.	
Echinoidea.	
Spatangidæ.	
Hemiaster, Desor., 1847	5
H. humphreysanus, M. & H., 1857, pl. x, figs. 1 *a–g*	5-6
Mollusca.	
Brachiopoda.	
Lyopomata.	
Lingulidæ.	
Lingula, Brugnière, 1792	7-9
L. nitida, M. & H., 1861, pl. xxviii, figs. 18 *a, b*	9-10

* μικρός, small; στίξις, puncture.

Page.

Lamellibranchiata.
Monomyaria.
Ostreidæ.
Ostrea, Linnæus, 1758 10–12
Alectryonia, Fischer 11
Gryphæostrea, Conrad 11
Ostrea, sp. undt., pl. ii, figs. viii *a* and *b* 12–13
O. congesta, Conrad, 1843, pl. ix, figs. 1 *a–f* 13–14
O. inornata, M. & H., 1860, pl. x, fig. 4 14
O. pellucida, M. & H. 1860, pl. xxviii, figs. 4 *a* and *b* 15
O. (*Gryphæostrea?*) *subalata*, Meek, pl. xxviii, fig. 5 15–16
O. (*Gryphæa?*) *patina*, M. & H., 1856, pl. x, figs. 2 *a*, *b*; *a*, *b* (bis), and 3 *a*, *f*; also pl. xi varieties 16–18
Gryphæa, Lamarck, 1801 19
G. vesicularis, Lam.? 1806, pl. xi, figs. 2 *a–c*, and pl. xvi, figs. 8 *a*, *b* 20–21
Anomiidæ.
Anomia, Linnæus, 1767 21–22
A.? obliqua, M. & H., 1860, pl. ix, fig. 2 22
A.? subtrigonalis, M. & H., 1860, pl. xvi, figs. 4 *a*, *b* 22–23
Pectinidæ.
Chlamys, Bolten, 1798 23–25
C. nebracensis, M. & H., 1856, pl. xvi, figs. 6 *a–c* 25–26
Syncyclonema, Meek, 1864 26–27
S. rigida, H. & M., 1854, pl. xvi, figs. 5 *a*, *b* 27–28
Heteromyaria.
Pteriidæ.
Pteria, Scopoli, 1777 28–32
Electroma, Stoliczka 29
Pseudoptera, Meek 29
Oxytoma, Meek 29
P. linguiformis, Evans & Shumard, sp., 1854, pl. xvi, figs. 1 *a–d* 32–33
P. linguiformis var. *subgibbosa*, pl. xxviii, fig. 12 33
P. haydeni, H. & M., 1854, pl. xvi, figs. 2 *a*, *b* 33–34
P. (*Oxytoma*) *nebrascana*, E. & S., 1857, pl. xvi, figs. 3 *a*, *b*, and pl. xxviii, fig. 11 34–36
P. (*Pseudoptera*) *fibrosa*, M. & H., 1856, pl. xvii, figs. 17 *a–d* 36–37
Inoceramus, Sowerby, 1819 38–41
Subgenus *Inoceramus* 38–39
Mytiloides, Brongniart 39
Catillus (Brongniart?), Chenu 39
Actinoceramus, Meek 39
Volviceramus, Stoliczka 40
I. (*Inoceramus*) *fragilis*, H. & M., 1854, pl. v, fig. 5, and figs. 1 and 2, p. 42 42–43
I. (*Inoceramus*) *altus*, Meek, 1871, pl. xiv, figs. 1 *a*, *b* 43–44
I. (*Volviceramus*) *umbonatus*, M. & H., 1858, pl. iii, figs. 1 *a–c*, and pl. iv, figs. 1 *a–b* and 2 *a*, *b* 44–46
I. (*Volviceramus*) *exogyroides*, M. & H., 1862, pl. v, figs. 3 *a–c* 46–47
Subgenus *Catillus*, Brong.
I. (*Catillus*) *pertenuis*, M. & H., 1856, pl. xxxvii, figs. 3 *a*, *b*, and pl. xxxviii, figs. 3 *a*, *b* 47–48
I. (*Catillus*) *cripsii?* var. *subcompressus*, M. & H., pl. xxxviii, fig. 2 *bis* 48–49
I. (*Catillus*) *cripsii?* var. *barabini*, Morton, 1834, pl. xiii, figs. 1 *a–c*, and pl. xii, fig. 3, figs. 1–4 49–50
I. (*Catillus*) *convexus*, H. & M., 1854, pl. xii, figs. 5 *a* and *b* 51–52
I. (*Catillus*) *sagensis* var. *nebrascensis*, Owen, 1852, pl. xiii, figs. 2 *a*, *b* 52–53
I. (*Catillus*) *proximus*, Tuomey? 1854, pl. xii, figs. 7 *a*, *b* 53–55
I. (*Catillus*) *proximus?* var. *subcircularis*, Meek, pl. xii, figs. 2 *a*, *b* 55–56
I. (*Catillus*) *balchii*, M. & H., 1860, pl. xv, figs. 1 *a*, *b* 56
I. (*Catillus*) *tenuilineatus*, H. & M., 1854, pl. xii, fig. 6 57
I. (*Catillus*) *vanuxemi*, M. & H., 1860, pl. xiv, figs. 2 *a*, *b* 57–58
I. (*Catillus*) *sublævis*, H. & M., 1854, pl. xii, figs. 1 *a* and *b* 58–59
I. (*Catillus*) *tenuirostris*, M. & H., 1862, fig. 5 59
I. (*Catillus*) *undabundus*, M. & H., 1862, pl. iii, figs. 2 *a*, *b* 60–61
I. (*Catillus*) *incurvatus*, M. & H., 1856, pl. xii, figs. 4 *a* and *b* 61
Subgenus *Mytiloides*, Brong.
I. (*Mytiloides*) *problematicus*, Schlot., pl. ix, figs. 3 *a*, *b* 62

Subgenus *Leptomactra*, Monk. Section (a) ... 1

P. Leptomactra subquadrata, H. & A., sp., 1857, pl. xxix, figs. 8 *a–c* ...

P. Leptomactra rara, H. & A. sp., 1857, pl. xvii, figs. 1 *a–c* ...

P. Leptomactra? *portucala*, M. & H., 1881, figs. 13 and 14, p. 176 ... 17

Venerupis

Callista, Poli, 1791 ...

Callista, Poli, typical = *Chione* Gray: not of Mühlfeldt) ...

Dione, Gray ...

Macrocallista, Monk ...

Pitar, Roem. = *Argusia*, Recluz) ...

Aphrodina, Conrad ...

Dosiniopsis, Conrad ...

D. Dosiniopsis decrepa, M. & H., 1858, pl. xvii, figs. 15 *a–c* ... 18

D. Dosiniopsis curvirostra, M. & H., 1858, pl. xxxvii, fig. 1 ... 18

D. Dosiniopsis subrotundata, M. & H., 1858, figs. 15–17, p. 134 ... ? ... 18

D. Dosiniopsis orbiculata, H. & M., 1854, pl. v, figs. 2 *a–c* ... 18

D.? pallasoides, M. & H., 1858, pl. xvii, figs. 10 *a–c* and figs. 12 *a–c* ... 18

D. Aphrodina? *tenuis*, H. & M., pl. v, figs. 1 *a–d* ... 18

Phacia, Sowerby, 1825 ... 18

P.? ovoidea, M. & H., 1858, pl. xvii, figs. 8 *a–c* and figs. 18, 19, p. 130 ... 19

Tellinides

Tellina, Linnæus, 1758 ... 19

Tellinella, Gray ...

Peronæoderma (Poli), Mörch ...

Moera, H. & A. Adams = *Donacilla*, Gray: not Lam)

Psammotæa, Stoliczka ...

Phyllodina, Schumacher ...

Angulus, Schumacher (= *Tellinula*, Cham., *Fabulina*, Gray) ...

Tellinodon, Lam ...

Homalina, Stoliczka ...

Peronæa, Poli (= *Omala*, Schum., corrected *Homala*, by Agassiz; also *Homala*, H. & A. Adams) ...

Metis, H. & A. Adams ... 19

T. (Elma?) subsimilis, Monk, 1871, pl. ii, figs. 11 *a* and *b* ... 19

T. (Peronæa?) equitalvoides, M. & H., 1858, pl. xxxix, figs. 5 *a–c* ... 19

T. (Peronæa?) anitula, M. & H., 1858, pl. xxx, figs. 1 *a, b* ... 19

Limaria, Conrad, 1869 ... 19

L.? formosa, M. & H., 1869, pl. xxx, fig. 2 ... 19

Arcopagella, Monk, 1871 ... 20

A. mactroides, Monk, 1871, pl. ii, figs. 4 *a–d* ...

	Page.
Complanaria, Swainson	113
Unionopsis, Swainson (= *Calceola*, Swainson, 1840; not Lam., 1799)	113
M. nebrascensis, Meek, 1871, pl. i, figs. 5 *a–c*	114–115
Crassatellidæ.	
Crassatella, Lamarck, 1801	115–117
Subgenus *Pachythærus*, Conrad, 1870	116
C. (*Pachythærus*) *evansi*, H. & M., 1854, pl. xvii, figs. 6 *a–d*	117–118
Crassatellina, Meek, 1871	118–120
C. oblonga, Meek, 1871, pl. ii, figs. 3 *a–c*	120–121
Eriphyla, Gabb, 1864	121–124
E. gregaria, M. & H., 1856, pl. xvii, figs. 9 *a*, *b*, figs. 6 and 7, p. 124	124–126
Solemyidæ.	
Solemya, Lamarck, 1818	126–129
S. subplicata, M. & H., 1856, pl. xxviii, fig. 19	129
Lucinidæ.	
Lucina, Bruguière, 1792	130–133
Myrtea, Turton, 1822	130
Cyclas, H. & A. Adams, 1857 (not Brug.)	131
Milthea, H. & A. Adams, 1857	131
L. subundata, Hall & Meek, 1854, pl. xvii, figs. 2 *a–c*	133–134
L. occidentalis, Morton, 1842, pl. xvii, figs. 4 *a–d*	134–135
L. occidentalis var. *ventricosa*, M. & H., 1860, pl. xvii, figs. 3 *a–c*	135–136
Sphæriola, Stoliczka, 1871	136–137
S.? cordata, M. & H., 1857, pl. xxix, figs. 3 *a–c*	137–138
S.? warrenana, Meek	138
S.? endotrachys, Meek, pl. xxix, fig. 2	139
Tancredidæ.	
Tancredia, Lycett, 1850	140–142
T. americana, M. & H., 1856, pl. xxxviii, figs. 1 *a–h*	142–144
Glossidæ.	
Cyprina, Lamarck, 1812	144–146
C. ovata, M. & H., 1857, pl. xxix, figs. 7 *a–c*, and fig. 8, p. 146	146–147
C. ovata var. *compressa*, M. & H., pl. xxx, fig. 11	147
Veniella, Stoliczka, 1870 (= *Venilia*, Morton; not of Duponchel, or Alder & Hancock)	147–152
Venilicardia, Stoliczka, 1870	149
V. conradi, Morton, figs. 9–11	148
V. goniophora, n. s., Meek, 1876, pl. iv, fig. 4 and fig. 12, p. 152	152–153
V. mortoni, M. & H., 1862, pl. iv, figs. 3 *a*, *b*	154
V. subtumida, M. & H., 1857, pl. xvii, figs. 5 *a*, *b*	154–150
V. (*Venilicardia?*) *humilis*, M. & H., 1860, pl. xxx, figs. 5 *a–c*	155–156
Cyrenidæ.	
Cyrena, Lamarck, 1818	157–158
Egeta, H. & A. Adams, 1858	157
Cyrena dakotensis, M. & H., pl. i, figs. 1 *a–f*	159–160
Corbicula, Mühlfeldt, 1811	160–163
Veloritina, Meek	161
Leptesthes, Meek	161
C.? nucalis, Meek, 1872, pl. ii, figs. 5 *a*, *c*	163–164
C.? subtrigonalis, Meek, 1872, pl. ii, fig. 6	164–165
Cardiidæ.	
Cardium, Linnæus, 1758 (= *Acanthocardium*, Gray)	165–168
Pectunculus (Adanson), Stoliczka; but not H. & A. Adams and others	166
Trachycardium, Mörch	166
Oriocardium, Conrad	166
Tropidocardium, Roemer (*Cardium* proper of most authors)	166
Cerastoderma (Poli), Mörch	166
Nemocardium, Meek	167
C. (*Oriocardium*) *speciosum*, M. & H., 1856, pl. xxxvii, figs. 4 *a–c*	169–170
C. kansasense, Meek, 1871, pl. ii, figs. 14 *a–d*	170–171
Protocardia, Beyrich, 1845	171
Pachycardium, Conrad	172
Leptocardia, Meek	172
Subgenus, *Protocardia*	172
P. (*Protocardia*) *salinænsis*, Meek, 1871, pl. ii, figs. 13 *a–c*	174

	Page.
Subgenus, *Leptocardia*, Meek, Section (a)	175
P. (*Leptocardia*) *subquadrata*, E. & S., sp., 1857, pl. xxix, figs. 8 *a–c*	175
P. (*Leptocardia*) *rara*, E. & S. sp., 1857, pl. xvii, figs. 1 *a–c*	176
P. (*Leptocardia ?*) *pertenuis*, M. & H., 1861, figs. 13 and 14, p. 176	176-177
Veneridæ.	
Callista, Poli, 1791	177
Callista, Poli, typical (= *Ohione* Gray; not of Mühlfeldt)	178
Dione, Gray	178
Macrocallista, Meek	179
Pitar, Roem. (= *Caryatis*, Roemer)	179
Aphrodina, Conrad	179
? Dosiniopsis, Conrad	179
C. (*Dosiniopsis*) *deweyi*, M. & H., 1856, pl. xvii, figs. 15 *a–c*	182–183
C. (*Dosiniopsis*) *owenana*, M. & H., 1856, pl. xxxvii, fig. 1	183–184
C. (*Dosiniopsis*) *nebrascensis*, M. & H., 1856, figs. 15–17, p. 184	184–186
C. (*Dosiniopsis*) *orbiculata*, H. & M., 1854, pl. v, figs. 2 *a–c*	186–187
C. ? pellucida, M. & H., 1856, pl. xvii, figs. 10 *a–c* and figs. 12 *a–c*	187–188
C. (*Aphrodina ?*) *tenuis*, H. & M., pl. v, figs. 1 *a–d*	188–189
Thetis, Sowerby, 1826	189–190
T. ? circularis, M. & H., 1856, pl. xvii, figs. 8 *a–c* and figs. 18, 19, p. 190	190–191
Tellinidæ.	
Tellina, Linnæus, 1758	192–193
Tellinella, Gray	193
Peronæoderma (Poli), Mörch	193
Mœra, H. & A. Adams (= *Donacilla*, Gray; not Lam)	193
Palæomoera, Stoliczka	193
Phylloda, Schumacher	193
Angulus, Schumacher (= *Tellinula*, Chem., *Fabulina*, Gray)	193
Tellinides, Lam	193
Homalina, Stoliczka	194
Peronæa, Poli (= *Omala*, Schum., corrected *Homala*, by Agassiz; also *Homola*, H. & A. Adams)	194
Metis, H. & A. Adams	194-195
T. (*Œne ?*) *subscitula*, Meek, 1871, pl. ii, figs. 11 *a* and *b*	195-196
T. (*Peronæa ?*) *equilateralis*, M. & H., 1856, pl. xxxix, figs. 5 *a–c*	196-197
T. (*Peronæa ?*) *scitula*, M. & H., 1856, pl. xxx, figs. 1 *a*, *b*	197-198
Linearia, Conrad, 1860	198-199
L. ? formosa, M. & H., 1860, pl. xxx, fig. 2	199-200
Arcopagella, Meek, 1871	200-202
A. mactroides, Meek, 1871, pl. ii, figs. 4 *a–d*	202
A. ? macrodonta, n. s., Meek, 1876, pl. i, fig. 2	202-203
Mactridæ.	
Mactra, Linnæus, 1767	203-204
Mactra, Linn. (typical = *Trigonella*, da Costa)	204
Cymbophora, Gabb	204
Schizodesma, Gray	204-206
Mactra (*Cymbophora*) *? siouxensis*, M. & H., 1860, pl. i, figs. 7 *a–c*	206
M. (*Cymbophora ?*) *formosa*, M. & H., 1856, pl. xxxix, fig. 7	207
M. (*Cymbophora ?*) *warrenana*, M. & H., 1856, pl. xxx, figs. 7 *a–d*	208
M. (*Cymbophora ?*) *gracilis*, M. & H., 1860, pl. xvii, figs. 18 *a*, *b*	209
M. (*Cymbophora*) *alta*, M. & H., 1856, pl. xxxvii, figs. 2 *a*, *b*	210
M. (*Cymbophora ?*) *nitidula*, M. & H., 1861, pl. xxx, figs. 6 *a–c*	211-213
Pholadomyidæ.	
Pholadomya, Sowerby, 1823	213-214
Procardia, Meek	215-216
P. papyracea, M. & H., 1862, pl. v, figs. 4 *a*, *b*	217
P. subcentricosa, M. & H., 1857, pl. xxxix, figs. 8 *a*, *b*	217-218
Subgenus *Procardia*	219
P. (*Procardia*) *hodgii*, Meek, 1871, pl. xiii, figs. 3 *a*, *b*	219
Goniomya, Agassiz, 1838	220-221
G. americana, M. & H., 1856, pl xxx, figs. 12 *a*, *b*	121-122
Anatinidæ.	
Thracia, Leach, 1819	222-223
T. ? subtortuosa, M. & H., 1856, pl. xxxvii, fig. 5	223-224
T. gracilis, M. & H., 1856, pl. xxxix, figs. 6 *a*, *b*	224-225

Page.

T. ? prouti, M. & H., 1860, pl. xxxvii, figs. 6 *a, b* 225–226
Liopistha, Meek, 1864 227–236
Cymella, Meek 229
Psilomya, Meek 229
L. protexta, Conrad. figs. 20–24 227
Cymella bella, Conrad, figs. 25–30 228
Subgenus *Cymella*, Meek 236
Liopistha (*Cymella*) *undata*, M. & H., 1856, pl. xxxix, figs. 1 *a, b* 236–237
Neaera, Gray, 1834 237–238
N. ventricosa, M. & H., 1856, pl. xxx, figs. 3 *a–c* 238–239
N. moreauensis, M. & H., 1856, pl. xvii, figs. 11 *a–c* 239–240
Corbulidæ
Corbula, Bruguière, 1792 240–244
Anisorhynchus, Conrad 241
Pachyodon (= *Pachydon*, Gabb. and *Anisothyris*, Conrad) 241
Corbula crassimarginata, M. & H., 1860, pl. xvii, figs. 14 *a–c* 244–245
C. inornata, M. & H., 1856, pl. xxx, figs. 4 *a–d* 245–246
Corbulamella, M. & H., 1857 246
C. gregaria, M. & H., 1857, pl. xvii, figs. 13 *a–d* 247
Saxicavidæ.
Glycimeris, Lamarck, 1799 248–249
G. occidentalis, M. & H., 1856, pl. xxxix, figs. 9 *a, b* 250
Solenidæ.
Pharella, Gray, 1854 250–251
P. ? dakotensis, M. & H., 1860, pl. i, fig. 3 251–252
Leptosolen, Conrad, 1867 252–253
L. conradi, Meek, 1872, pl. ii, figs. 12 *a, b* 253–254
Pholadidæ.
Turnus, Gabb, 1864 254–256
Goniochasma, Meek 255
Xylophagella, Meek 255
T. (*Goniochasma*) *stimpsoni*, M. & H., 1857, pl. xxx, figs. 9 *a, b* 256–257
T. (*Xylophagella*) *elegantulus*, M. & H., 1857, pl. xxx, figs. 10 *a–c* 257–258
Martesia, Leach, 1824 258–259
M. cuneata, M. & H., 1858, pl. xxx, figs. 8 *a, b* 259–260
Teredidæ.
Teredo, Linnæus, 1758 260–262
Calobates, Gould 261
T. selliformis, M. & H., 1860, pl. xvii, figs. 19 *a–d* 262–263
T. globosa, M. & H., 1858, pl. xxx, fig. 13 (burrows), figs. 31, 32, p. 264 264–265
Gasteropoda.
Solenoconchæ.
Dentaliidæ.
Dentalium, Linn., 1758 266
D. gracile, H. & M., 1854, pl. xviii, figs. 13 *a–d* 266–267
Entalis, Sowerby, 1839 267–268
E. paupercula, M. & H., 1860, pl. xviii, fig. 14 269
Testibranchiata.
Bullidæ.
Haminea, Leach, 1847 270–271
H. occidentalis, M. & H., 1856, pl. xviii, figs. 11 *a, b*, and 12 *a, b* 271–272
H. suboylindrica, M. & H., 1856, pl. xviii, figs. 10 *a, b* 272–273
H. minor, M. & H., 1856, pl. xxxi, figs. 1 *a, b* 273
Cylichnidæ.
Cylichna, Lovén, 1846 274–275
Mnestia, H. & A. Adams 274
C. ? volvaria, M. & H., 1856, pl. xxxi, figs. 2 *a, b* 275–276
C. scitula, M. & H., 1860, pl. xxxi, figs. 3 *a, b* 276–277
Actæonidæ.
Actæon, Montfort, 1810 277–280
A. subellipticus, M. & H., 1856, pl. xix, fig. 16 280–281
A. attenuatus, M. & H., 1858, pl. xix, figs. 17 *a, b* 281–282
Ringiculidæ.
Ringicula, Gray, 1840 282–283
Oligoptycha, Meek 283

Page

Avellana, d'Orbigny, 1843 ... 2
Cinulia (*Oligoptycha*) *concinna*, H. & M., sp., 1854, pl. xxxi, 6 bis. *a–e* ... 2
Pulmonata.
Siphonariidæ.
Anisomyon, M. & H., 1860 ... 285
A. borealis, M. & H., 1860, pl. xviii, figs. 9 *a–c* ... 286
A. shumardi, M. & H., 1860, pl. xviii, figs. 7 *a–c* ... 289
A. patelliformis, M. & H., 1860, pl. xviii, figs. 5 *a–f* (not *d* and *e*) ... 290
A. subovatus, M. & H., 1856, pl. xviii, figs. 5 *d* and 6 ... 291
A. alveolus, M. & H., 1860, pl. xviii, figs. 4 *a*, *b* ...
A. sexsulcatus, M. & H., 1860, pl. xviii, figs. 8 *a*, *b* ...
Docoglossa.
Acmæidæ.
Acmæa, Esch.
A. occidentalis, M. & H., 1860, pl. xviii, figs. 3 *a*, *b* ... 295
A.? parva, M. & H., 1860, pl. xviii, figs. 1 *a–c*, and fig. 2 ...
A.? papillata, M. & H., 1860, pl. xxxi, figs. 4 *a*, *b* ... 296
Rhipidoglossa.
Trochidæ.
Margarita, Leach, 1819 ...
M. nebrascensis, M. & H., 1860, pl. xix, figs. 8 *a*, *b*, 9 *a*, *b* ... 298
M. mudgeana, Meek, 1871, pl. ii, figs. 9 *a*, *b* ...
Margaritella, M. & H., 1860 ... 300
M. flexistriata, E. & S., 1854, pl. xix, figs. 11 *a–d* ...
Pectinibranchiata.
Tritonidæ.
Trachytriton, Meek, 1864 ... 303
T. vinculum, H. & M., sp., 1856, pl. xix, figs. 7 *a–d* ... 304
* *Closteriscus*, n. g., Meek, 1876 ... 306
C. tenuilineatus, H. & M., sp., 1856, pl. xix, figs. 10 *a*, *b*, and 9 *e* ... 308
Naticidæ.
Gyrodes, Conrad, 1860 ... 309
G. conradi, Meek, figs. 33–36, p. 310 ... 310
Lunatia, Gray, 1847 ... 311
L. concinna, H. & M., sp., 1854, pl. xxxii, figs. 11 *a–c* ... 314
L. occidentalis, M. & H., 1856, pl. xxxii, figs. 12 *a–c* ... 315
L. subcrassa, M. & H., 1856, pl. xxxix, figs. 3 *a–c* ... 316
Amauropsis, Mörch, 1857 ... 317
A. paludinæformis, H. & M., sp., 1854, pl. xix, figs. 15 *a–c* ... 318
Aporrhaidæ.
Aphorrhais, Dillwyn, 1823 ... 320
Alipes, Conrad, 1865 (= *Goniocheila*, Gabb) ...
Arrhoges, Gabb, 1868 ...
Aporrhais biangulata, M. & H, 1856, pl. xix, figs. 6 *a–c* ... 322
Anchura, Conrad, 1860 ...
Drepanochilus, Meek, 1864 (= *Perissoptera*, Tate, in part) ...
A. (*Drepanochilus*) *americana*, E. & S., sp., 1857, pl. xxxii, figs. 8 *a*, *b* ... 325
A. (*Drepanochilus*) *nebrascensis*, E. & S., sp., 1854, pl. xix, figs. 5 *a–c* ... 326
A.? sublevis, M. & H., 1860, pl. xix, figs. 3 *a*, *b* ... 327
A.? parva, M. & H., 1860, pl. xix, figs. 4 *a*, *b* ...
Vanikoridæ.
Vanikoro, Quoy & Gaim. 1832 ...
V. ambigua, M. & H., 1856, pl. xix, figs. 12 *a–d* ... 330
Vanikoropsis,† n. g., Meek, 1876 ...
V. tuomeyana, M. & H., sp., 1856, pl. xxxix, figs. 2 *a*, *b* ...
Turritellidæ.
Mesalia, Gray, 1842 ... 332
M. kansasensis, Meek, 1871, pl. ii, figs. 7 *a*, *b* ... 333
Cerithiopsidæ.
Cerithiopsis, Forbes & Hanley, 1849 ... 334
Alaba, H. & A. Adams, 1853 ...
Seila, A. Adams, 1861 ...
Cerithiopsis moreauensis, M. & H., 1856, pl. xxxi, fig. 4 (not 4 *a*, *b*), fig. 38, p. 336 ... 336

* κλωστήρ, a spindle (diminutive of). † Vanikoro; ὄψις, form.

	Page.
Pyramidellidæ.	
Chemnitzia, d'Orbigny, 1850	337–339
C. cerithiformis, M. & H., sp., 1856, pl. xxxii, figs. 10 *a*, *b*	339–341
Littorinidæ.	
Spironema, Meek, 1864	341–342
S. tenuilineata, M. & H., sp., 1856, pl. xxxii, figs. 9 *a–c*	342–343
Muricidæ.	
Pyrifusus, Conrad, 1858	343–345
Neptunella, Meek, 1864 (not Gray)	344
Pyrifusus (*Neptunella*) *nexberryi*, M. & H., 1856, pl. xxxi, fig. 6 *a–f*, fig. 39, p. 346	346–347
P. (*Neptunella*) *subturritus*, M. & H., sp., 1857, pl. xxxii, figs. 3 *a*, *b*, and fig. 40, p. 347	347–348
P. (*Neptunella*) *intertextus*, M. & H., sp., 1857, pl. xix, figs. 14 *a*, *b*	348–349
Buccinidæ.	
? Pseudobuccinum, M. & H., 1856	349–350
P. nebrascense, M. & H., 1856, pl. xxxi, figs. 5 *a–d*	350–351
? Odontobasis,* n. g., Meek, 1876	351–352
O. constricta, H. & M., sp., 1856, figs. 41, 42, p. 353	352–354
Fasciolariidæ.	
Fasciolaria, Lamarck, 1799	355–358
Terebrispira, Conrad, 1862	356
Piestochilus, Meek, 1864	356
Mesorhytis, Meek	356
Cryptorhytis, Meek	356
Fasciolaria buccinoides, M. & H., 1856, pl. xxxi, figs. 8 *a–d*	358–359
F. (*Piestochilus*) *scarboroughi*, M. & H., 1857, pl. xxxii, figs. 4 *a–d*	359–360
F. (*Piestochilus*) *culbertsoni*, M. & H., 1856, pl. xxxii, figs. 1 *a–f*, fig. 44, p. 360	360–362
F. (*Piestochilus*) *galpiniana*, M. & H., sp., 1856, pl. xxxii, figs. 2 *a*, *b*	362–363
F. (*Piestochilus*) *cretacea*, M. & H., 1856, pl. xxxi, figs. 11 *a*, *b*	363–364
F.? (Mesorhytis) gracilenta, Meek, fig. 45, p. 364	364–365
F.? (Cryptorhytis) cheyennensis, M. & H., sp., 1860, pl. xix, figs. 13 *a*, *b*	365–366
F.? (Cryptorhytis) flexicostata, M. & H., sp., pl. xix, fig. 2 and fig. 46, p. 367	367–368
Pyropsis, Conrad, 1860	368–30
P. bairdi, M. & H., sp., 1856, pl. xxxi, figs. 10 *a*, *b*	369–379
P. bairdi var. *rotula*, Meek, pl. xxxi, fig. 10 and fig. 47, p. 371	371–372
Fusus, Bruguière, 1789	372–374
Serrifusus, Meek	373
Sinistralia, H. & A. Adams, 1853	373
Fusus? (Serrifusus) dakotensis, M. & H., 1856, pl. xxxi, fig. 11 and pl. 32, figs. 6 *a*, *b*	374, 375
F.? (Serrifusus) dakotensis, var., pl. xxxii, fig. 7 *a* and 7 *b?*	375–377
Cantharus, Bolten, 1798	377–379
Tritonidea, Swainson, 1840	378
Cantharulus, Meek	378
C. (*Cantharulus*) *vaughani*, M. & H., sp., pl. xxxii, figs. 5 *a*, *b*, and fig. 48, p. 379	379–380
Pleurotomidæ.	
Turris, Bolten, 1798	380–384
Surcula, H. & A. Adams, 1853 (= *Turricula*, Schum.; not of others)	381
Surculites, Conrad, 1865	382
Genota, H. & A. Adams, 1853 (not Adanson)	382
T. minor, E. & S., sp. 1857, pl. xxxi, figs. 9 *a–c*	384–385
T. (*Surcula*)*? contortus*, M. & H., 1856, pl. xxxi, figs. 7 *a–c*, fig. 49, p. 385	385–386
T. (*Surcula*)*? hitzi*, Meek, fig. 50, p. 387	386–388
Cephalopoda.	
Tetrabranchiata.	
Baculitidæ	388–391
Baculites, Lamarck, 1799	391–394
Cyrtochilu, Meek	392
B. ovatus, Say, 1821, pl. xx, figs. 2 *a*, *b*, *d*, and 1 *a*, *b*, and fig. 52, p. 397	394–397
B. grandis, H. & M., 1854, pl. xxxiii, figs. 1 *a–c* and fig. 53, p. 399 and fig. 54, p. 400	396–400
B. compressus, Say, 1821, pl. xx, figs. 3 *a–c* and figs. 55, 56, p. 403	400–404
B. asper, Morton? 1834, pl. xxxix, figs. 10 *a*, *d* (not *b*, *c*)	404–405
B. anceps var. *obtusus*, figs. 57–60, p. 406	406–408

* ὀδούς, a tooth; βάσις, a base.

Page.

Ancyloceratidæ.
Ancyloceras, d'Orbigny, 1841 ... 408–409
A.? uncum, M. & H., 1858, pl. xxi, figs. 1 *a*, *b* ... 409–410
Ptychoceratidæ.
Ptychoceras, d'Orbigny, 1841 ... 410–412
P. mortoni, M. & H., 1857, pl. xx, figs. 4, *a–c* ... 412–413
Scaphitidæ.
Scaphites, Parkinson, 1811 ... 413–418
Macroscaphites, Meek ... 414
Scaphites, Parkinson ... 414
Discoscaphites, Meek, 1872 ... 15
S. larvæformis, M. & H., 1856, pl. vi, figs. 6 *a–c* ... 418–419
S. warreni, M. & H., 1860, pl. vi, fig. 5 and figs. 61, 62, p. 421 ... 420–423
S. vermiformis, M. & H., 1862, pl. vi, figs. 4 *a*, *b* ... 423–425
S. ventricosus, M. & H., 1862, pl. vi, figs. 7 *a*, *b*, and figs. 8 *a*, *b* ... 425–426
S. nodosus var. *brevis*, pl. xxv, figs. 1 *a–c* ... 426–427
S. nodosus var. *quadrangularis*, pl. xxv, figs. 3 *a–c*, 2 *a–c* and fig. 4 ... 428–429
S. nodosus var. *plenus*, pl. xxvi, figs. 1 *a–c* ... 429–430
S. (Discoscaphites) conradi, Morton, sp., 1834, pl. xxxvi, figs. 3 *a–c* ... 430–432
S. (Discoscaphites) conradi, var. *gulosus*, Morton, 1834, pl. xxxvi, fig. 1 ... 432–433
S. (Discoscaphites) conradi, var. *intermedius*, pl. xxxiv, figs. 3 *a–c* ... 433–435
S. (Discoscaphites) nicoletii, Morton, sp., 1841, pl. xxxiv, figs. 4 *a–c* and 2 *a–b* ... 435–437
S. (Discoscaphites) cheyennensis, Owen, sp., 1852, pl. xxxv, figs. 3 *a–i* ... 437–441
S. (Discoscaphites) abyssinus, Morton, sp., 1841, pl. xxxv, figs. 2 *a*, *b* and 4 ... 441–443
S. (Discoscaphites) mandanensis, Morton, sp., 1841, pl. xxxv, figs. 1 *a–c* ... 443–445
Ammonitidæ.
Ammonites, Brug., 1789 ... 445–447
A. complexus, H. & M., 1854, pl. xxiv, figs. 1 *a–c* ... 447–448
Mortoniceras, n. g., Meek, 1876 ... 448–449
M. shoshonense, Meek, pl. vi, figs. 3 *a*, *c* and 6 *b* ... 449–450
M.? vermilionense, M. & H., 1860, pl. vii, fig. 2 *a*, *b* ... 450–452
Prionocyclus, Meek, 1872 ... 452–453
Prionotropis, Meek ... 453
P. (Prionotropis) woolgari, Mantell, sp., 1822, pl. vii, figs. 1 *a–k*, and pl. vi, fig. 2 ... 455–457
Phylloceras, Suess, 1865 ... 457
P.? halli, M. & H., 1856, pl. xxiv, figs. 3 *a–c* and fig. 64, p. 458 ... 458–462
Placenticeras, Meek, 1870 ... 462–463
Sphenodiscus, Meek, 1872 ... 463
P. placenta, DeKay, sp., 1828, pl. xxiv, figs. 2 *a*, *b* and fig. 65, p. 466 ... 465–468
P. placenta var. *intercalare*, pl. xxiii, figs. 1 *a–c* ... 468–472
P. (Sphenodiscus) lenticulare, Owen, sp., 1852, pl. xxxiv, figs. 1 *b–c*, fig. 66, p. 473 ... 473–476
Turrilitidæ.
Heteroceras, d'Orbigny, 1849 ... 477–478
H.? cochleatum, H. & M., pl. xxii, figs. 2 *a*, *b* ... 478–479
H.? nebrascense, M. & H., 1856, pl. xxii, figs. 1 *a–c* ... 480–481
H. tortum, M. & H., 1858, pl. xxii, figs. 4 *a–c* ... 481–482
H.? umbilicatum M. & H., 1858, pl. xxii, fig. 5 ... 482–483
H.? cheyennense, M. & H., 1856, pl. xxi, figs. 2 *a*, *b* ... 483–484
H.? angulatum, M. & H., 1860, pl. xxi, figs. 3 *a–c* ... 484–485
Helicoceras, d'Orbigny, 1840 ... 485–487
Patoceras, Meek[1] ... 485
Helicoceras mortoni var. *tenuicostatum*, pl. xxii, figs. 3 *a–c* ... 487–489
Nautilidæ.
Nautilus, Linnæus, 1758 ... 489–495
Temnochilus, McCoy, 1844 ... 491
Trematodiscus, M. & W., 1861 ... 491
Discites (De Hann), McCoy, 1825 ... 491
Solenochilus, M. & W., 1870 (= *Cryptoceras*, d'Orbigny) ... 491
Hercoglossa, Conrad, 1866 (= *Aganides*, Montfort?) ... 491
Pseudonautilus, Meek ... 491
N. dekayi, Morton, 1834, pl. xxvii, figs. 1 *a–c* and fig. 67, p. 496 ... 496–498
N. dekayi var. *moanoaensis*, pl. xxvii, figs. 2 *a–c* ... 498
N. elegans, Sowerby, 1816, pl. viii, figs. 2 *a–c* ... 499–501

[1] πατος, a path; κερας, a horn.

Page.

H. subconica, Meek, fig. 77, p. 573 ... 573
H.? culimoides, Meek, fig. 78, p. 573 ... 573–574
Micropyrgus, Meek, 1866 ... 574–575
M. minutulus, M. & H., 1856, pl. xliii, figs. 18 *a*, *b* ... 575
Viviparidæ.
Viviparus, Montfort, 1810 ... 576–577
V. leai, M. & H., 1856, pl. xliv, figs. 6 *a–d* ... 577–578
V. retusus, M. & H., 1856, pl. xliv, figs. 5 *a–f* ... 578–579
V. conradi, M. & H., 1856, pl. xlii, figs. 15 *a–d* ... 579–580
V. peculiaris, M. & H., 1856 fig. 79. ... 580
V. trochiformis, M. & H., 1856, pl. xliv, fig. 2 *a–e* ... 580–582
V. leidyi, M. & H., 1856, pl. xliv, fig. 4 ... 582–583
V. leidyi var. *formosus*, pl. xliv, figs. 3 *a*, *b* ... 583
V. raynoldsanus, M. & H., 1861, pl. xliv, figs. 7 *a*, *b* ... 584–585
Campeloma, Rafinesque ...
C. multilineata, M. & H., 1856, pl. xliv, figs. 1 *a*, *b* ... 586–587
C. vetula, M. & H., 1856 pl. xliv, figs. 14 *a*, *b* ... 587–588
C. multistriata, M. & H., 1856, pl. xliii, figs. 15 *a–e*, and fig. 80, p. 588 ... 588–589
Valvatidæ.
Valvata, Müller, 1774 ... 589–590
Tropidina, H. & A. Adams, 1856 ... 590
V. subumbilicata, M. & H., 1856, pl. xliii, figs. 13 *a–e* ... 590–591
V. parvula, M. & H., 1856 ... 591
V.? montanaensis, Meek, figs. 81, 82, 83, p. 591 ... 591–592

FOSSILS OF THE WIND RIVER TERTIARY.

Mollusca.
Gasteropoda.
Pulmonata.
Vitrinidæ.
Macrocyclis, Beck, 1837 ... 593–594
Ampelita, Beck, 1837 ... 594
M. spatiosa, M. & H., 1861, pl. xlii, figs, 9 *a–c* ... 594–595
Helicidæ.
Helix, Linn ... 596
H.? veterna, M. & H., 1861, pl. xlii, figs. 8 *a*, *b*, and figs. 84, 85, p. 596 ... 596–597

FOSSILS OF THE WHITE RIVER TERTIARY.

Mollusca.
Gasteropoda.
Pulmonata.
Limnæidæ.
Limnæa, Lamarck ... 598
L. meekiana, E. & S., pl. xlv, figs. 5 *a–c* ... 598–599
L. shumardi, Meek, pl. xlv, figs. 6 *a*, *b* ... 599
Planorbis, Müller ... 599
P. leidyi, M. & H., 1860, pl. xlv, figs. 3 *a–d* ... 599–600
Subgenus *Menetus*, H. & A. Adams? ... 600
P. (*Menetus*) *nebraskensis*, E. & S., 1854, pl. xlv, figs. 2 *a*, *b* ... 600–601
P. (*Menetus*) *vetustus*, M. & H., 1860, pl. xlv, figs. 1 *a–c* ... 601–602
Physidæ.
Physa, Draparnaud, 1801 ... 603–604
Physella, Haldeman, 1842 ... 603
Physodon, Haldeman, 1842 ... 603
Isidora, Ehrenb., 1831 (= *Diastropha*, Guilding) ... 604
Costella, Dall, 1870 ... 604
P. secalina, E. & S., 1854, pl. xlv, figs. 4 *a*, *b* ... 604
Helicidæ.
Helix, Linn ... 604
H. leidyi, H. & M., 1854, pl. xlv, figs. 7 *a*, *b* ... 604–605

APPENDIX.

Tellina (*Arcopagia*)? *cheyennensis*, M. & H., 1856, pl. xvii, fig. 16 ... 607
Ammonites?? *mullananus*, M. & H., 1862, pl. viii, figs. 1 *a–c* ... 607–609

	Page.
Polyrhytis, Meek	532
Bulimnea, Haldeman, 1842	532
Limnophysa, Fitzinger, 1833 (=*Stagnicola*, Leach & *Galba*, Schranck)	533
Omphiscola, Raf. (=*Leptolimnea*, Swainson)	533
Acella, Haldeman, 1842	533
Pleurolimnæa, Meek, 1866	533
L. (*Pleurolimnæa*) *tenuicostata*, M. & H., 1856, pl. xliv, figs. 13 *a–e*	534
Planorbis, Müller, 1776	534–536
Helisoma, Swainson, 1840	535
Planorbella, Haldeman, 1842	536
Taphius, H. & A. Adams, 1856	536
Menetus, H. & A. Adams, 1856 (=*Anisus*, Beck, not Fitz.)	536
Anisus, Fitzinger, 1833 (=*Tropidiscus*, Stein.)	536
Bathyomphalus, Agassiz, 1837 (=*Spirorbis*, Swainson, not Lamarck)	536
Gyraulus, Agassiz (=*Nautilina*, Stein.)	536
P. convolutus, M. & H., 1856, pl. xlii, figs. 12 *a*, *b*	536–537
P. convolutus var., pl. xlii, figs. 11 *a–e*	538
P. (*Bathyomphalus*) *planoconvexus*, M. & H., 1857, pl. xliv, figs. 9 *a–e*	538–539
P. (*Bathyomphalus*) *amplexus*, M. & H., 1857, pl. lxii, figs. 16 *a–e*	539
Physidæ.	
Bulinus, O. F. Müller, 1781	540
B. subelongatus, M. & H., 1856, pl. lxii, figs. 13 *a*, *b*	540–541
B. longiusculus, M. & H., 1856, pl. xliii, figs. 16 *a*, *b*	541–542
B. rhomboideus, M. & H., 1856, pl. xliii, fig. 17	542
Ancylidæ.	
Acroloxus, Beck, 1837	543
A. minutus, M. & H., 1856, pl. xliv, fig. 10	543–544
Vitrinidæ.	
Vitrina, Drapernaud, 1801	544
V.? obliqua, M. & H., 1857, pl. xlii, figs. 10 *a*, *b*	545
Hyalina, Férussac, 1819	545–547
H.? occidentalis, M. & H., 1857, pl. xlii, figs. 6 *a–d*	547–548
H.? evansi, M. & H., 1860, figs. 68, 69, 70, p. 548	548–549
Helicidæ.	
Helix, Linnæus, 1758	549–551
Galaxias, Beck, 1837	549
Camæna, Albers, 1850	550
Helix vetusta, M. & H., 1860, pl. xlii, figs. 7 *a*, *b*	552
Thaumastus, Albers, 1860	553
T. limnæiformis, M. & H., 1856, pl. xliv, figs. 8, *a–d*	553–554
Columna, Perry, 1811	554
Rhodea, H. & A. Adams, 1855	555
Columna teres, M. & H., 1856, pl. xliv, figs. 11 *a*, *b*	555–556
O. vermicula, M. & H., 1856, pl. xliv, figs. 12 *a*, *b*	556–557
O. vermicula var. *contraria*, Meek, 1866	557
Pectinibranchiata.	
Cerithiidæ.	
Cerithidea, Swainson, 1840	558
Pirenella, Gray, 1847	558
Cerithidea (*Pirenella?*) *nebrascensis*, M. & H., 1856, pl. xliii, figs. 9 *a–c* (*bis*)	559
Ceriphasiidæ.	
Goniobasis, Lea, 1862	560–561
G. convexa, M. & H., 1856, pl. xlii, figs. 2 *a*, *b*, and figs. 71, p. 562 and 72, p. 563	562–563
G. convexa var. *impressa*, M. & H., 1857, pl. xlii, figs. 2 *c*, *d*	563–564
G. invenusta, M. & H., 1857, pl. xlii, figs. 1 *a–e*	564–565
G. nebrascensis, M. & H., 1856, pl. xliii, figs. 12 *a–h*, and fig. 73, p. 565	565–566
G. tenuicarinata, M. & H., 1857, pl. xliii, figs. 14 *a–c*	566–567
G. sublævis, M. & H., 1857, pl. xlii, figs. 5 *a*, *b*	567
G.? omitta, M. & H., 1857, pl. xlii, figs. 4 *a–c*	568
G. gracilenta, Meek, pl. xlii, fig. 3 and fig. 74, p. 569	568–569
G.? subtortuosa, M. & H. 1857, pl. xlii, figs. 17, *a–b*, and figs. 75, 76, p. 569	569–570
Rissoidæ.	
Hydrobia, Hartmann, 1821	571
H. anthonyi, M. & H., 1856, pl. xliii, figs. 10 *a–d*	571–572
H. warrenana, M. & H., 1857, pl. xliii, figs. 1 *a–c*	572–573

	Page.
H. subconica, Meek, fig. 77, p. 573	573
H. ? eulimoides, Meek. fig. 78, p. 573	573–574
Micropyrgus, Meek, 1866	574–575
M. minutulus, M. & H., 1856, pl. xliii, figs. 18 *a, b*	575
Viviparidæ.	
Viviparus, Montfort, 1810	576–577
V. leai, M. & H., 1856, pl. xliv, figs. 6 *a–d*	577–578
V. retusus, M. & H., 1856, pl. xliv, figs. 5 *a–f*	578–579
V. conradi, M. & H., 1856, pl. xlii, figs. 15 *a–d*	579–580
V. peculiaris, M. & H., 1856 fig. 79	580
V. trochiformis, M. & H., 1856, pl. xliv, fig. 2 *a–c*	580–582
V. leidyi, M. & H., 1856, pl. xliv, fig. 4	582–583
V. leidyi var. *formosus*, pl. xliv, figs. 3 *a, b*	583
V. raynoldsanus, M. & H., 1861, pl. xliv, figs. 7 *a, b*	584–585
Campeloma, Rafinesque	
C. multilineata, M. & H., 1856, pl. xliv, figs. 1 *a, b*	586–587
C. vetula, M. & H., 1856 pl. xliv, figs. 14 *a, b*	587–588
C. multistriata, M. & H., 1856, pl. xliii, figs. 15 *a–c*, and fig. 80, p. 588	588–589
Valvatidæ.	
Valvata, Müller, 1774	589–590
Tropidina, H. & A. Adams, 1856	590
V. subumbilicata, M. & H., 1856, pl. xliii, figs. 13 *a–c*	590–591
V. parvula, M. & H., 1856	591
V. ? montanaensis, Meek, figs. 81, 82, 83, p. 591	591–592

FOSSILS OF THE WIND RIVER TERTIARY.

Mollusca.	
Gasteropoda.	
Pulmonata.	
Vitrinidæ.	
Macrocyclis, Beck, 1837	593–594
Ampelita, Beck, 1837	594
M. spatiosa, M. & H., 1861, pl. xlii, figs. 9 *a–c*	594–595
Helicidæ.	
Helix, Linn	596
H. ? veterna, M. & H., 1861, pl. xlii, figs. 8 *a, b*, and figs. 84, 85, p. 596	596–597

FOSSILS OF THE WHITE RIVER TERTIARY.

Mollusca.	
Gasteropoda.	
Pulmonata.	
Limnæidæ.	
Limnæa, Lamarck	598
L. meekiana, E. & S., pl. xlv, figs. 5 *a–c*	598–599
L. shumardi, Meek, pl. xlv, figs. 6 *a, b*	599
Planorbis, Müller	599
P. leidyi, M. & H., 1860, pl. xlv, figs. 3 *a–d*	599–600
Subgenus *Menetus*, H. & A. Adams ?	600
P. (*Menetus*) *nebrascensis*, E. & S., 1854, pl. xlv, figs. 2 *a, b*	600–601
P. (*Menetus*) *vetustus*, M. & H., 1860, pl. xlv, figs. 1 *a–c*	601–602
Physidæ.	
Physa, Draparnaud, 1801	603–604
Physella, Haldeman, 1842	603
Physodon, Haldeman, 1842	603
Isidora, Ehrenb., 1831 (= *Diastropha*, Guilding)	604
Costella, Dall, 1870	604
P. secalina, E. & S., 1854, pl. xlv, figs. 4 *a, b*	604
Helicidæ.	
Helix, Linn	604
H. leidyi, H. & M., 1854, pl. xlv, figs. 7 *a, b*	604–605

APPENDIX.

Tellina (*Arcopagia*) *? cheyennensis*, M. & H., 1856, pl. xvii, fig. 16	607
Ammonites ? ? mullananus, M. & H., 1862, pl. viii, figs. 1 *a–c*	607–609

106.

MEEK, F. B. Palæontology. <Rep. Geol. Expl. 40th Parallel, vol. iv, part i, pp. 1–197, pls. i–xvii. Washington, 1877.

Silurian, Devonian, Carboniferous, Triassic, Jurassic, Cretaceous, Tertiary. Genera *Eutomoceras* (Hyatt), *Eudiscoceras* (Hyatt), *Polyrhytis*, *Rhytophorus*, *Pyrgulifera*.

DESCRIPTIONS OF FOSSILS.

SILURIAN SPECIES.	Page.
Mollusca.	
Gasteropoda.	
Solaridæ.	
? Ophileta, Vanuxem	17
O. complanata var. *nana*, Meek, 1870, pl. i, figs. 1, 1 *a*, 1 *b*	17–18
Raphistoma, Hall	18
R. ? rotuliformis, Meek, 1870, pl. i, figs. 2, 2 *a*, *b*	18–19
R. ? trochiscus, Meek, 1870, pl. i, figs. 3, 3 *a*, *b*	19
Articulata.	
Crustacea.	
Paradoxidæ.	
Conocoryphe, Corda	20
C. (Ptychoparia) kingii, Meek, 1870, pl. i, fig. 4	20–22
Paradoxides, Bronguiart	22
P. ? nevadensis, Meek, 1870, pl. i, fig. 5	22–25

DEVONIAN SPECIES.	
Radiata.	
Polypi.	
Favositidæ.	
Alveolites, Lamarck	25
A. multilamella, n. s., Meek, 1877, pl. ii, figs. 7, 7 *a*, *b*	25–26
Alveolites, undt. sp., Meek, 1877	26–27
Favosites, Lamarck	27
Favosites, undt. sp., Meek, 1877, pl. i, fig. 6	27
F. polymorpha, Goldf.? var. Meek, 1877, pl. ii, fig. 3	27–28
Syringopora, Goldfuss	28
Syringopora, undt. sp., Meek, 1877	28
Cyathophyllidæ.	
Ptychophyllum, E. & H.	28
P. ? infundibulum, n. s., Meek, 1877, pl. ii, figs. 1, 1 *a*, *b*	28–29
Diphyphyllum, Lonsdale	29
D. fasciculum, n. s., Meek, 1877, pl. ii, figs. 4, 4 *a*, *b*	29–31
Acervularia, Schweigger	31
A. pentagona, Goldfuss, sp., 1826, pl. ii, figs. 5, 5 *a*	31–32
Smithia, E. & H.	32
S. hennahii, Lonsdale, sp., 1840, pl. 2, figs. 6, 6 *a*	32–33
Cyathophyllum, Goldfuss	33
C. palmeri, n. s., Meek, 1877, pl. ii, fig. 2	33–34
Mollusca.	
Brachiopoda.	
Strophomenidæ.	
Hemipronites, Pander	35
H. chemungensis var. *arctostriata*, Conrad, sp., pl. iii, fig. 2	35–36
Productidæ.	
Productus, Sowerby	36
P. subaculeatus, Murchison ? 1840, pl. iii, figs. 7, 7 *a*, *b*	36–37
Rhynchonellidæ.	
? Atrypa, Dalman	38
A. reticularis, Linnæus, sp., 1767, pl. i, figs. 7 and 7 *a*, and pl. 3, figs. 6 ? 6 *a*	38, 39
Spiriferidæ.	
Spirifer, Sowerby	39
S. utahensis, Meek, 1860, pl. iii, figs. 1, 1 *a–e*	39–41
S. engelmanni, Meek, 1860, pl. iii, figs. 3 *a–c* (and 3 *d–f ?*)	41–42
S. (Trigonotreta) argentarius, n. s., Meek, 1877, pl. iii, figs. 4 and 4 *a*, *b*	42–43
S. (Trigonotreta) strigosus, Meek, 1860, pl. iii, figs. 5, 5 *a*, *b*	43–45
S. (Trigonotreta) piñonensis, Meek, 1870, pl. i, figs. 9, 9 *a*, *b*	45–46
Lamellibranchiata.	

	Page.
Anatinidæ.	
Edmondia, de Koninck	46
E.? piñonensis, n. s., Meek, 1877, pl. i, figs. 8, 8 *a*	46–47
Cephalopoda.	
Orthoceratitidæ.	
Orthoceras, Auct.	
O. kingii, n. s., Meek, 1877, pl. ii, fig. 8	47–48
Orthoceras, undt. sp., Meek, 1877, pl. ii, fig. 9	48
Articulata.	
Crustacea.	
Phacopsidæ.	
Dalmanites, Auct.	48
Dalmanites, sp. undt., Meek, 1877, pl. i, figs. 11, 11 *a*	48–49
Proetidæ.	
Proetus, Steininger	49
P. (Phæton) denticulatus, n. s., Meek, 1877, pl. i, figs. 10, 10 *a* and *b*	49–50

CARBONIFEROUS SPECIES.

Radiata.	
Polypi.	
Favositidæ.	
Syringopora, Goldfuss	50
Syringopora, undt. sp., Meek, 1877, pl. vi, figs. 2, 2 *a*	50–51
Cyathophyllidæ.	
Zaphrentis, Rafinesque & Clifford	52
Z. excentrica, n s., Meek, 1877, pl. iv, figs. 1, 1 *a–d*	52–53
Z.? multilamella, Hall? 1852, pl. vi, figs. 4, 4 *a* and *b*	53–54
Z.? stansburii, Hall? 1852, pl. vi, figs. 3, 3 *a–c*	54–56
Campophyllum, E. & H	57
Campophyllum, undt. sp., Meek, 1877, pl. v, figs. 2, 2 *a* and *b*	57–58
Lithostrotion, Fleming	58
L. whitneyi, Meek, n. s., 1875, pl. vi, figs. 1, 1 *a–c*	58–59
Cyathophyllum, Goldfuss	60
C. (Campophyllum?) nevadense, n. s., Meek, 1877, pl. v, figs. 3, 3 *a* and *b*	60
C. subcæspitosum, n. s., Meek, 1877, pl. v, figs. 4, 4 *a* and *b*	60–61
Mollusca.	
Brachiopoda.	
Strophomenidæ.	
Hemipronites, Pander	62
H. crenistria, Phillips, sp., 1836, pl. vii, fig. 2	62
Orthis, Dalman	63
O. michelini, L'Éveillé, var. Meek, 1877, pl. vii, figs. 1, 1 *a–c*	63–64
Productidæ.	
Productus, Sowerby	64
P. nevadensis, n. s., Meek, 1877, pl. viii, figs. 2, 2 *a–c*	64–67
Productus, undt. sp., Meek, 1877, pl. vii, figs. 6, 6 *a* and *b*	67–68
P. semireticulatus, Martin, 1709, pl. vii, fig. 5	69
P. costatus, Sowerby? var. Meek, 1877, pl. vii, figs. 4, 4 *a* and *b*	69–72
P. prattenianus, Norwood, 1854, pl. vii, fig. 7	72–73
P. semistriatus, Meek, 1860 pl. vii, figs. 8, 8 *a*	74–75
P. subhorridus, n. s., Meek, 1877, pl. vii, figs. 3, 3 *a* and *b*	75–76
P. multistriatus, Meek, 1860, pl. viii, figs. 3, 3 *a–c*	76–78
P. longispinus, Sowerby, 1814, pl. viii, figs. 4, 4 *a*	78–79
Rhynchonellidæ.	
Leiorhynchus, Hall.	79
L. quadricostatus, Vanuxem? sp., 1842, pl. iii, figs. 9, 9 *a* and *b*	79–80
Spiriferidæ.	
Athyris, McCoy	81
A.? persinuata, n. s., Meek, 1877, pl. ix, figs. 4, 4 *a* and *b*	81–82
A. roissyi, l'Éveillé, sp., 1835, pl. ix, figs. 3, 3 *a* and *b*	82–83
A. subtilita, Hall, 1852, pl. viii, figs. 6, 6 *a*	83–84
Spiriferina d'Orbigny	84
Spiriferina, undt. sp., Meek, 1877, pl. viii, figs. 5, 5 *a*, *b*	84–85
S. pulchra Meek, 1860, pl. viii, figs. 1, 1 *a–e*, and pl. xii, figs. 12, 12 *a–d?*	85–87
Spirifer, Sowerby	87
S. cuspidatus, Martin? sp., 1796, pl. iii, figs. 11, 11 *a*	87–88
Spirifer (Trigonotreta) opimus, Hall? 1858, pl. ix, fig. 6	89–90
S. (Trigonotreta) scobina, Meek, 1860, pl. ix, figs. 1, 1 *a–d*	90–91
S. (Trigonotreta) cameratus, Morton, 1836, pl. ix, figs. 2, 2 *a*	91–93

	Page.
Lamellibranchiata.	
Pteriidæ.	
† Posidonomya, Bronn	92
P. † fragosa, n. s., Meek, 1877, pl. iii, figs. 8, 8 *a*	92–93
Aviculopecten, McCoy	93
A. catactus, n. s., Meek, 1877, pl. iii, figs. 10, 10 *a*, and 10 *b* †	93–95
A. utahensis, Meek, 1860, pl. ix, figs. 7, 7 *a* and *b* (and 7 *c*, and *d* †)	95–96
A. occidaneus, n. s., Meek, 1877, pl. xii, figs. 13, 13 *a* and *b*	96–97
Cephalopoda.	
Goniatitidæ.	
Goniatites, De Haan	98
G. goniolobus, n. s., Meek, 1877, pl. ix, figs. 5, 5 *a*, *b*	98–99
UPPER TRIASSIC SPECIES.	
Mollusca.	
Brachiopoda.	
Discinidæ.	
Discina, Lamarck	99
Discina, sp. undt., Meek, 1877, pl. x, figs. 3, 3 *a*	99–100
Lamellibranchiata.	
Pteriidæ.	
Halobia, Bronn	100
H. (Daonella) lommeli, Wissmann, 1841, pl. x, fig. 5	100–102
Lucinidæ.	
Sphæra, Sowerby	102
S. whitneyi, n. s., Meek, 1877, pl. x, figs. 4, 4 *a–c*	102
Mytilidæ.	
† Modiomorpha, H. & W	
M. † ovata, n. s., Meek, 1877, pl. x, figs. 1, 1 *a*	10[illegible]
M. † lata, n. s., Meek, 1877, pl. x, fig. 2	103–10[illegible]
Cephalopoda.	
Orthoceratitidæ.	
Orthoceras, Auct	10[illegible]
O. blakei, Gabb † 1864, pl. x, fig. 11	104–10[illegible]
AMMONITOID FORMS OF THE UPPER TRIAS OF NEVADA.	
Clydonitidæ, n. f., Hyatt, 1877	1[illegible]
**Coroceras*, n. g., Hyatt, 1877	107–1[illegible]
Clydonites, Hauer	1[illegible]
C. lævidorsatus, Hauer, sp., 1860, pl. x, fig. 7	109–1[illegible]
Trachyceratidæ.	
† *Gymnotoceras*, n. g., Hyatt, 1877	110–1[illegible]
G. rotelliforme, n. s., Meek, 1877, pl. x, figs. 9, and 9 *a*	111–1[illegible]
G. blakei, Gabb, sp., 1864, pl. x, figs. 10, 10 *a–c*, and pl. xi, figs. 6, 6 *a*	113–[illegible]
Trachyceras, Laube	[illegible]
T. whitneyi, Gabb, sp., 1864, pl. xi, figs. 3, 3 *a*	116–[illegible]
T. judicaricum, Mojsisovics, 1869, pl. xi, figs. 1, 1 *a*	[illegible]
T. judicaricum, var. *subasperum*, Meek, 1877, pl. xi, figs. 2, 2 *a* and *b*	118–[illegible]
Arcestidæ.	
Arcestes, Suess	119–[illegible]
A. † perplanus, n. s., Meek, 1877, pl. xi, figs. 7 and 7 *a*	120–[illegible]
A. gabbi, n. s., Meek, 1877, pl. x, figs. 6, 6 *a* and *b*	121–[illegible]
Physanoidæ.	
‡ *Acrochordiceras*, n. g., Hyatt, 1877	[illegible]
A. hyatti, n. s., Meek, 1877, pl. xi, figs. 5 and 5 *a*	124–[illegible]
Eutomoceras, n. g., Hyatt, 1877	126
E. laubei, n. s., Meek, 1877, pl. 10, figs. 8, 8 *a*	126–[illegible]
Eudiscoceras, n. g., Hyatt, 1877	128
E. gabbi, n. s., Meek, 1877, pl. xi, figs. 3 and 3 *a*	128–[illegible]
JURASSIC SPECIES.	
Mollusca.	
Lamellibranchiata.	
Limidæ.	
Lima, Bruguière	129
L. (Limatula) erecta, n. s., Meek, 1877, pl. xii, fig. 2	129

* κόρυς, a helmet; κερας, a horn.

† ἀκροχορδών, a wart; κερας, a horn.

‡ ἀκρος, naked; νῶτος, back; κερας, a horn.

Page.

Pinnidæ.
Pinna, Linnæus 131
P. kingii, n. s., Meek, 1877, pl. xii, figs. 9, 9 *a* 131–132
Mytilidæ.
Volsella, Scopoli 132
V. scalprum, var. *isonema*, Meek, 1877, pl. xii, figs. 4, 4 *a* 132–133
Trigoniidæ.
Myophoria, Bronn 133
M. lineata, Münster? 1834, pl. xii, figs. 3, 3 *a* 133–134
Arcidæ.
Cucullæa, Lamarck 134
C. haguei, n. s., Meek, 1877, pl. xii, figs. 1, 1 *a*, *b* 134–135
Anatinidæ.
Myacites, Auct 136
M. (*Pleuromya*) *subcompressa*, Meek, 1873, pl. xii, figs. 6, 6 *a* 136–137
M. inconspicuus, n. s., Meek, 1877, pl. xii, fig. 10 137
M. (*Pleuromya*) *weberensis*, n. s., Meek, 1877, pl. xii, figs. 11, 11 *a* 137–138
Cephalopoda.
Belemnitidæ.
Belemnites, Auct 138
B. nevadensis, n. s., Meek, 1877, pl. xii, figs. 7, 7 *a*, *b* (and 8 *a*, *b*?) 138–139

CRETACEOUS FOSSILS.

Mollusca.
Ostreidæ.
Ostrea, Linn 140
Ostrea, undt. sp., Meek, 1877, pl. xv, figs. 10, 10 *a–c* 140–141
Anomiidæ.
Anomia rætiformis, n. s., Meek, 1877, fig. 1, p. 141 141
Pteriidæ.
Inoceramus, Sowerby 142
I. simpsoni, Meek, 1860, pl. xiii, fig. 3 142–143
I. problematicus, Schlot? 1820, pl. xiii, figs. 2 and 2 *a* 143–144
Inoceramus, sp. undt., Meek, 1877, pl. xiii, figs. 4, 4 *a* 144
I. erectus, n. s., Meek, 1877, pl. xiii, figs. 1, 1 *a*, and pl. xiv, fig. 3 145
I. deformis, Meek, 1872, pl. xiv, figs. 4, 4 *a* 146–148
Arcidæ.
Cucullæa, Lamarck 148
C. (*Trigonarca?*) *obliqua*, n. s., Meek, 1877, pl. xiv, figs. 1, 1 *a–b* 148–149
Axinæa, Poli 149
A. wyomingensis, n. s., Meek, 1877, figs. 2 and 3, p. 150 149–150
Corbulidæ.
Corbula, Bruguière 150
Corbula, undt. sp., Meek, 1877, pl. xiv, fig. 2 150–151
Cardiidæ.
Cardium, Linnæus 151
C. curtum, M. & H.? 1861, pl. xv, fig. 3 (not 3 *a*) 151–152
C. subcurtum, Meek, 1873, pl. xv, fig. 3 *a* (not 3) 152–153
Mactridæ.
Mactra, Linnæus 153
M.? emmonsi, n. s., Meek, 1877, pl. xv, fig. 8 153–154
M. (*Trigonella*) *? arenaria*, n. s., Meek, 1877, pl. xiv, fig. 5 154–155
M. (*Cymbophora*) *? utahensis*, n. s., Meek, 1877, pl. xv, figs. 9, 9 *a*, *b* 155–156
Tellinidæ.
Tellina, Linnæus 156
T.? isonema, n. s., Meek, 1877, pl. xv, fig. 6 156–157
T. modesta, n. s., Meek, 1877, pl. xv, figs. 4–5 157–158
Veneridæ.
Cyprimeria, Conrad 158
C.? subalata, Meek, 1873, pl. xv, fig. 7 158–159
Gasteropoda.
Naticidæ.
Gyrodes, Conrad 159
G. depressa, n. s., Meek, 1877, pl. xv, figs. 1, 1 *a* 159–160
Aporrhaidæ.
Anchura, Conrad 160
A.? fusiformis, n. s., Meek, 1877, pl. xv, figs. 2, 2 *a* 160–161

Page.

Siphonariidæ.
? Anisomyon, M. & H 162
A. sexsulcatus, M. & H.? 1856, figs. 4 and 5, p. 162 162

FOSSILS OF THE BEAR RIVER FRESH OR BRACKISH WATER BEDS.

Mollusca.
Lamellibranchiata.
Unionidæ.
Unio, Retzius 164
U. vetustus, Meek, 1860, pl. xvi, figs. 5, 5 *a–c* 164–165
U. belliplicatus, Meek, 1870, pl. xvi, figs. 4, 4 *a* 165–167
Cyrenidæ.
Corbicula, Benson 167
C. (Veloritina) durkeei, Meek, 1870, pl. xvi, figs. 6 *a–g* 167–170
Corbulidæ.
Corbula, Brug 170
C. (Anisorhynchus) pyriformis, Meek, 1860, pl. xvii, figs. 2, 2 *a–d* 170–174
C. (Anisorhynchus?) engelmanni, Meek, 1860, pl. xvii, figs. 1, 1 *a* 174–175
Gasteropoda.
Auriculidæ.
Rhytiphorus, Meek, 1873 175
R. priscus, Meek, 1860, pl. xvii, figs. 6 and 6 *a* 175–176
Ceriphasiidæ.
Pyrgulifera humerosa, Meek, 1860, pl. xvii, figs. 19, 19 *a*, and fig. 6, p. 177 ..... 176–17[illegible]
Viviparidæ.
Viviparus, Montfort ..... 17[illegible]
V. conradi, M. & H., 1856, pl. xvii, figs. 18, 18 *a* ..... 178–17[illegible]
Campeloma, Rafinesque ..... 17[illegible]
C. macrospira, Meek ? 1872, pl. xvii, figs. 17 *a, b* ..... 179–18[illegible]
Campeloma (undt. sp.), Meek, 1877, pl. xvii, figs. 15 *a, b*, and fig. 16 *a–e* ..... 18[illegible]
Limnæidæ.
Limnæa, Lamarck ..... 18[illegible]
L. (Limnophysa) nitidula, Meek, 1860, pl. xvii, figs. 5, 5 *a* ..... 181–1[illegible]

SPECIES OF UNDOUBTED TERTIARY AGE.

Mollusca.
Lamellibranchiata.
Cyrenidæ.
Sphærium, Scopoli.
S. rugosum, Meek, 1870, pl. xvi, figs. 2, 2 *a, b* 182–183
S.? idahoense, Meek, 1870, pl. xvi, fig. 1, 1 *a* 183–184
Unionidæ.
Unio, Retzius 184
U. haydeni, Meek, 1860, pl. xvi, figs. 3, 3 *a, b* 184–185
Gasteropoda.
Limnæidæ.
Ancylus, Geoffroy 186
A. undulatus, Meek, 1870, pl. xvii, figs. 12 *a, b* 186
Carinifex, Binney 187
Subgenus *Vorticifex*, Meek, 1870 187
C. (Vorticifex) binneyi, Meek, 1870, pl. xvii, figs. 11, 11 *a* 187–188
C. (Vorticifex) tryoni, Meek, 1870, pl. xvii, figs. 10, 10 *a–c* 188–189
Planorbis, Guettard 189
P. spectabilis, Meek, 1860, pl. xvii, figs. 13, 13 *a–f* 189
P. spectabilis var. *utahensis*, Meek, 1860, pl. xvii, figs. 14, 14 *a–c* 190–191
Limnæa, Lamarck 191
L. (Limnophysa) retusta, Meek, 1860, pl. xvii, figs. 4, 4 *a, b* 191
L. similis, Meek, 1860, pl. xvii, figs. 3, 3 *a* 191–192
L. (Polyrhytis) kingii, n. s., Meek, 1877, figs. 6 and 7, p. 192 192–193
Ceriphasiidæ.
Gonobasis, Lea 193
G. simpsoni, Meek, 1860, pl. xvii, figs. 7, 7 *a–d* 193–195
Melaniidæ.
Melania, Auct 195
M.? sculptilis, Meek, 1870, pl. xvii, fig. 8 195–196
M.? subsculptilis, Meek, 1870, pl. xvii, fig. 9 196–197

PART II.

THE PUBLISHED WRITINGS OF CHARLES ABIATHAR WHITE, 1860–1884.

II.—THE PUBLISHED WRITINGS OF CHARLES ABIATHAR WHITE, A. M., M. D.

This catalogue is intended to embrace the titles and place of publi cation, not only of all the scientific writings of Dr. White, but his re views of the writings of other authors, and his more popular article also. In only a few instances however, are newspaper articles, of whicl he has written many, noticed on the following pages; but the inten tion has been to make entry of all his short published notes whicl contain any expression of his views upon scientific subjects, as well a of his more elaborate works. The annotations which accompany thi catalogue are made up mainly from data furnished by the author of th works, and all expressions of opinion upon geologic and paleontologi subjects contained in them should be regarded as his own.

Charles A. White was born in North Dighton, Bristol County, Massa chusetts, on January 26, 1826. He has held the following official posi tions in education and science, to which subjects most of his writing pertain: State Geologist of Iowa, by legislative appointment, from 186 to 1869, inclusive; Professor of Natural History in the Iowa State Uni versity, from 1867 to 1873; Professor of Natural History in Bowdoin Col lege, from 1873 to 1875; Paleontologist to the U. S. Geographical and Geological Surveys West of the 100th Meridian, in charge of Lieut. George M. Wheeler, in 1874; Geologist and Paleontologist to the U. S. Geological Survey of the Territories, in charge of Maj. J. W. Powell, in 1875; Geolo gist and Paleontologist to the U. S. Geological Survey of the Territories in charge of Dr. F. V. Hayden, from 1876 to 1879; in charge of paleon tological collections in the U. S. National Museum from 1879 to 1882 detailed in 1881 to act as chief of the Artesian Wells Commission upon the Great Plains, under the auspices of the U. S. Agricultural Depart ment; Geologist to the U. S. Geological Survey in 1882; Paleontologis to the U. S. Geological Survey in 1883, which position he now holds together with honorary curatorship in the U. S. National Museum President of the Biological Society of Washington for the years 188 and 1884.

A partial bibliography of Dr. White appeared in the "American Field" for March and April, 1885; this is by Charles Aldrich.

1.

WHITE, C. A. Observations upon the Geology and Paleontology of Burlington, I and its Vicinity. <Bost. Jour. Nat. Hist., (Bost. Soc. Nat. Hist.) vol. vii, pp. 235. Boston, 1861.

Same. Boston, 1860, 8vo., p. 209–235. Fifty separates printed without title-p covers, or repaging.

The 50 separates appeared at the date mentioned, but Part II of vol. vii, according to t inserted in it, did not appear until December, 1862, although it bears the imprint 1861.

This paper is divided into two parts; in the first, details of local geology are given, and tion is called to the fact that in this locality the change from Devonian to Carboniferous took so gradually as to render it impossible to point out the exact line where one ends and the begins. A section of the rocks at Burlington is given with a table showing the vertical of shells, and a list of the genera discovered in the rocks at Burlington, showing the dif beds in which they have been recognised.

The second part contains descriptions of seven new species of *Brachiopoda* from the Che rocks at Burlington, Iowa.

P

Rhynchonella pustulosa, n. s., White, 1860 .....
Nucleospira barrisii, n. s., White, 1860 2
Terebratula burlingtonensis, n. s., White, 1860 2
Athyris crassicardinalis, n. s., White, 1860 2
Productus laviconstus, n. s White, 1860..... 2
Orthis thiemei, n. s., White, 1860 2
Spirifer solidirostris, n. s., White, 1860 2

This part also contains a list of described fossils recognised in the Burlington beds.. 2

2.

WHITE, C. A., and WHITFIELD, R. P. Observations upon the Rocks of the Missis Valley which have been referred to the Chemung Group of New York, toge with Descriptions of New Species of Fossils from the same horizon at Burling Iowa. <Proc. Bost. Soc. Nat. Hist., vol. viii, pp. 289–306. Boston, 1862.

Same. Boston, 1862, 8vo., pp. 289–306. Fifty separates printed without title-p covers, or repaging.

Thirty-one species of Lower Carboniferous fossils are described in this paper.

Description of new species.

P

Brachiopoda.
Orthis, Dalman .....
O. subelliptica, n. s., White & Whitfield, 1862..... 29
Streptorhynchus, King .....
S. inflatus, n. s., White & Whitfield, 1862 .....
Spirifer, Sowerby.....
S. hirtus, n. s., White & Whitfield, 1862..... 29
Retzia, King .....
R. explicata, n. s., White & Whitfield, 1862 .....
Rhynchonella, Fischer .....
R. opposita, n. s., White & Whitfield, 1862..... 29
Pentamerus, Sowerby.....
P. lenticularis, n. s., White & Whitfield, 1862 .....
Conchifera.
Aviculo-pecten, McCoy .....
A. limaformis, n. s., White & Whitfield, 1862 29
A. nodocostatus, n. s., White & Whitfield, 1862.....
Mytilus, Linn.....
M. febristriatus, n. s., White & Whitfield, 1862 29
M. occidentalis, n. s., White & Whitfield, 1862 .....
Subgenus *Orthonota*, Conrad .....
M. (Orthonota) ventricosa, n. s., White & Whitfield, 1862..... 29
Nucula, Lamarck.....
N. iowensis, n. s., White & Whitfield, 1862 .....
Leda, Schum.....
L. barrisii, n. s., White & Whitfield, 1862 .....

	Page.
Macrodon, Lycett	298
M. parvus, n. s., White & Whitfield, 1862	299
Conocardium, Bronn	299
C. pulcellum, n. s., White & Whitfield, 1862	299
Cypricardia? rigida, n. s., White & Whitfield, 1862	300
Cypricardella, Hall	300
C. quadrata, n. s., White & Whitfield, 1862	300–301
Edmondia, Koninck	301
E. burlingtonensis, n. s., White & Whitfield, 1862	301
Gasteropoda.	
Euomphalus, Sowerby	301
E. ammon, n. s., White & Whitfield, 1862	301
Platyceras, Conrad	302
P. parabum, n. s., White & Whitfield, 1862	302
P. bivalve, n. s., White & Whitfield, 1862	302
Pleurotomaria, Defrance	302
P. mississippiensis, n. s., White & Whitfield, 1862	302
Murchisonia, D'Archiac	303
M.? prolixa, n. s., White & Whitfield, 1862	303
Porcellia, Léveillé	303
P. crassinoda, n. s., White & Whitfield, 1862	303
Bellerophon, Montfort	304
B. vinculatus, n. s., White & Whitfield, 1862	304
B. peregrinus, n. s., White & Whitfield, 1862	304
B. bilabiatus, n. s., White & Whitfield, 1862	304–305
Cephalopoda.	
Goniatites, De Haan	305
G. opimus, n. s., White & Whitfield, 1862	305
Radiata.	
Lophophyllum, Edwards & Haime	305
L. calceola, n. s., White & Whitfield, 1862	305–306
Zaphrentis, Rafinesque	306
Z. acutus, n. s., White & Whitfield, 1862	306
Favosites, Lam	306
F.—[Whitfieldi]	306

3.

White, C. A. Observations on the Summit Structure of Pentremites, the Structure and Arrangement of certain Parts of Crinoids, and Descriptions of New Species from the Carboniferous Rocks of Burlington, Iowa. < Boston Jour. Nat. Hist. (Boston Soc. Nat. Hist.), vol. vii, pp. 481–506. Boston, 1863.

Same. Boston, 1863. 8vo, pp. 581–506. Fifty separates printed without title-page, covers, or repaging.

The summit structure of *Pentremites norwoodi*, *P. stelliformis*, *P. lineatus*, and *P. elongatus* is noticed. Instances of the recuperative power of Crinoids are also given. The genus *Coliocrinus* is proposed, and five species of Crinoids are described.

Some observations on certain modifications of the structure of the probosces of *Actinocrinus* are given, p. 489–491.

	Page.
*Coliocrinus**, n. g., White, 1863	499–501
C. subspinosus, n. s., White, 1863	501–502
Platycrinus, Miller	502
P. verrucosus, n. s., White, 1863	502–503
P. incomptus, n. s., White, 1863	503–504
Cyathocrinus, Miller	504
C. lamellosus, n. s., White, 1863	504–505
Scaphiocrinus, Hall	505
S. rusticellus, n. s., White, 1863	505–506

* Κοιλία, venter; κρίνον, lilium.

4.

WHITE, C. A. Descriptions of new species of Fossils from the Devonian and Carboniferous Rocks of the Mississippi Valley. < Proc. Boston Soc. Nat. Hist., vol. ix, pp. 8–33. Boston, 1865.

Same. Boston, 1862. 8vo, pp. 8–33. Fifty separates printed without title-page, covers, or repaging.

Forty-five species and two varieties of fossils are described, and the genera *Belemnocrinus* and *Acambona* are proposed. The author now regards the latter as identical with *Eumicrotis*, Hall.

	Page.
Echinodermata.	
Crinoidea.	
Cyathocrinus, Miller	8
C. rigidus, n. s., White, 1862	8
C. kelloggi, n. s., White, 1862	8-9
Poteriocrinus, Miller	9
P. ob-uncus, n. s., White, 1862	9
P. salignoideus, n. s., White, 1862	10
P. bursæformis, n. s., White, 1862	10-11
Bursacrinus, Meek & Worthen	11
B. confirmatus, n. s., White, 1862	11
Zeacrinus, Troost	11
Z. perangulatus, n. s., White, 1862	11-12
Z. sacculus, n. s., White, 1862	12-13
Z. sacculus var. *concinnus*, White, 1862	13
**Belemnocrinus*, n. g., White, 1862	14
B. typus, n. s., White, 1862, figs. 1 and 2, p. 13	14-15
Actinocrinus, Miller	15
A. quadrispinus, n. s., White, 1862	15
A. wachsmuthi, n. s., White, 1862	15-16
A. nashvillæ, Troost, var. *subtractus*, White, 1862	16
Megistocrinus, Owen & Shumard	16
M. plenus, n. s., White, 1862	16-17
M. crassus, n. s., White, 1862	17
Platycrinus, Miller	17
P. pleurovimenus, n. s., White, 1862	17-18
P. quinquenodus, n. s., White, 1862	18-19
Dichocrinus, Munster	19
D. angustus, n. s., White, 1862	19
D. crassitestus, n. s., White, 1862	19-20
Pentremites, Say	20
P. sirius, n. s., White, 1862, fig. 3, p. 20	20-21
Mollusca.	
Gasteropoda.	
Porcellia, Léveillé	21
P. obliquinoda, n. s., White, 1862	21
Bellerophon, Montfort	21
B. panneus, n. s., White, 1862	21
B. scriptiferus, n. s., White, 1862	21-22
Euomphalus, Sowerby	22
E. roberti, n. s., White, 1862	22
Pteropoda.	
Conularia, Miller	22
C. byblis, n. s., White, 1862	22
C. victa, n. s., White, 1862	22-23
Brachiopoda.	
Rhynchonella, Fischer	23
R. caput-testudinis, n. s., White, 1862	23
R. ottumwa, n. s., White, 1862	23-24
Spirifer, Sowerby	24
S. glans-cerasus, n. s., White, 1862	24
Observations on the genus *Spiriferina*, d'Orbigny	24-25

* βελεμνον, a dart; κρινον, a lily.

	Page.
S.? subtexta, n. s., White, 1862	25
Cyrtia, Dalman	25
C. curvilineata, n. s., White, 1862	25–26
Ambocælia, Hall	26
A. (Spirifer?) minuta, n. s., White, 1862	26
**Acambona*, n. g., White, 1872	27
A. prima, n. s., White, 1862, figs. 1 & 2, p. 27	27–28
Retzia, King, *Acambona*, White	28
R. (Acambona?) altirostris, n. s., White, 1862	28
Streptorhynchus, King	28
S. lens, n. s., White, 1862	28–29
Productus, Sowerby	29
P. viminalis, n. s., White, 1862	29
Chonetes, Fischer	29
C. geniculata, n. s., White, 1862	29
Crania, Retzius	29
C. sheldoni, n. s., White, 1862	29–30
C. reposita, n. s., White, 1862	30
Discina, Lamarck	30
D. capax, n. s., White, 1862	30
Lingula, Bruguière	30
L. kalki, n. s., White, 1862	30
Conchifera.	
Aviculopecten, McCoy	31
A. gradocostus, n. s., White, 1862	31
Cardiomorpha, de Koninck, *Cardiopsis*, Meek & Worthen	31
C. (Cardiopsis?) parvirostris, n. s., White, 1862	31
Gervillia, Defrance	31
G. strigosa, n. s., White, 1862	31
Zoophyta.	
Zaphrentis, Rafinesque et Clifford	31
Z. elliptica, n. s., White, 1862	31–32
Z. glans, n. s., White, 1862	32
Syringopora, Goldfuss	32
S. harveyi, n. s., White, 1862	32
Striatopora, Hall	32
S. carbonaria, n. s., White, 1862	32
Nullipora? obtusa, n. s., White, 1862	33

5.

WHITE, C. A. Fœtal hydrocephalus. <Chicago Medical Journal, vol. xxii, pp. 55–57. Chicago, 1865.

A report of an obstetrical case in which the child's cranium was too much enlarged to pass through the pelvic arch, and the serum was drawn off by an operation *in utero*.

6.

WHITE, C. A. Cerebro-spinal meningitis. <Chicago Medical Journal, vol. xxii, pp. 529–532. Chicago, 1865.

A report of a successful case, in which the application of dry heat to the extremities was a leading feature of the treatment.

7.

WHITE, C. A. The Soils of Iowa and their origin. <Report of the Secretary of the Iowa State Agricultural Society for the year 1865. pp. 245–267. Des Moines, 1866.

A popular lecture, delivered before the Society September 29, 1865. Some of the views expressed in the lecture have since been much modified by the author.

---

*ἀχή, a point; ὀμφαλός, umbo.

8.

WHITE, C. A. Observations on the genus Belemnocrinus. <Proc. Boston Soc. Nat. Hist., vol. x, p. 180. Boston, 1866.

This note is merely a rectification of the generic formula of *Belemnocrinus* as it was originally published in volume ix.

9.

WHITE, C. A. First Annual Report of Progress, of Charles A. White, State Geologist. pp. 1–4. Des Moines, 1867.

Probably not over fifty copies of this report were printed in its original form. It was reprinted on pages 5 to 8 of the first and second annual reports, Des Moines, 1868. See entry No. 20.

10.

WHITE, C. A. and ST. JOHN, O. H. Preliminary notice of new genera and species of fossils. By C. A. White, M. D., State Geologist, and O. H. St. John, Assistant. [pp. 1–3.] Iowa City, May 8, 1867.

This small publication of only fifty copies was made by the Iowa State Geological Survey. Four species are described. The genus *Meekella* proposed, *Cryptacanthia* suggested; and the whole, together with other matter, was republished in Vol. I, Transactions of the Chicago Academy of Sciences. See entry No. 15.

Protozoa.

Amphistegina, White & St. John, 1867.

Mollusca.

Aulosteges spondyliformis, n. s., White & St. John, 1867.

Waldheimia compacta, n. s., White & St. John, 1867.

Beyrichia lithofactor, n. s., White & St. John, 1867.

Beyrichia lithofactor var. *velata*, White & St. John, 1867.

Meekella, n. g., White & St. John, 1867.

11.

WHITE, C. A. Observations upon the Drift phenomena of Southwestern Iowa. <Amer. Jour. Sci., 2d ser., vol. xliii, pp. 301–305. New Haven, 1867.

Same. New Haven, 1867. 8vo., pp. 301–305. Twenty-five separates printed without covers, title-page, or repaging.

Mentions the occurrence of glacial striæ upon rocks *in situ*.

12.

WHITE, C. A. A Sketch of the Geology of Southwestern Iowa. <Amer. Jour. Sci., 2d ser., vol. xliv, pp. 23–31. New Haven, 1867.

Same. New Haven, 1867. 8vo, pp. 23–31. Twenty-five separates printed without title-page, covers, or repaging.

It is shown that the limestones of the region discussed belong to the upper and not to the lower Carboniferous series, as had been supposed by some previous authors.

13.

WHITE, C. A. Drift phenomena in Southwestern Iowa. <Amer. Jour. Sci., 2d ser., vol. xliv, p. 119. New Haven, 1867.

This is an additional note to the article of the preceding entry, which was inadvertently omitted by the printer.

14.

WHITE, C. A. Exogenous leaves in the Cretaceous rocks of Iowa. <Amer. Jour. Sci., 2d ser., vol. xliv, p. 119. New Haven, 1867.

A note announcing the discovery of exogenous leaves, and showing that the "Nishnabotany sandstone" is identical with the Dakota group.

15.

WHITE, C. A., and ST. JOHN, O. H. Descriptions of new Subcarboniferous and Coal-Measure Fossils, collected upon the Geological Survey of Iowa, together with notice of new generic characters observed in two species of Brachiopods. <Trans. Chicago Acad. Sci., vol. i, pp. 115–127, figs. 1–12. Chicago, 1867.

Same. Chicago, 1867. pp. 115–127. Fifty separates printed without title-page, covers, or repaging.

Fourteen species are described, four of which were previously described in the paper, entry No. 10. The genus *Tomoceras* is proposed, and the previously suggested genera *Meekella* and *Cryptacanthia* are proposed and illustrated.

Page.

Protozoa.
Polypi.
Cyathophyllidæ.
Axophyllum, Edwards & Haime ... 115
A. rudis, n. s., White & St. John, 1867 ... 115–116
Amplexus, Sowerby ... 116
A. fragilis, n. s., White & St. John, 1867 ... 116
Crinoidea.
Hydreinocrinus, De Koninck ... 117
H. verrucosus, n. s., White & St. John, 1867, fig. 1, p. 117 ... 117–118
Brachiopoda.
Craniidæ.
Crania, Retzius ... 118
C. modesta, n. s., White & St. John, 1867 ... 118
Productidæ.
Aulosteges, Helmersen ... 118
A. spondyliformis, n. s., White & St. John, 1867, fig. 2, p. 118 ... 118
Terebratulidæ.
Waldheimia, King ... 119
W.? compacta, White & St. John, 1867, fig. 3, p. 119 ... 119
Meekella, White & St. John, 1867 ... 120
M. striatocostata, White & St. John, figs. 4 and 5, p. 120, fig. 6, p. 121 ... 120–122
Pinnidæ.
Pinna, Linnæus ... 122
P. hinricksiana, n. s., White & St. John, 1867, fig. 7, *a b*, p. 122 ... 122–123
Gasteropoda.
Atlantidæ.
Cyrtolites, Conrad ... 123
C.? gillianus, n. s., White & St. John, 1867, fig. 8, p. 123 ... 123
Cephalopoda.
Nautilidæ.
Nautilus divisus, n. s., White & St. John, 1867, fig. 9, p. 124 ... 124
Nautilus (Cryptoceras) springeri, n. s., White & St. John, 1867, fig. 10, p. 124 ... 124, 125
Crustacea.
Cypridinidæ.
Beyrichia, McCoy ... 125
B. petrifactor, n. s., White & St. John, 1867 ... 125
B. petrifactor var. *velata*, White & St. John, 1867 ... 126
B. fatoidea, n. s., White & St. John, 1867, fig. 11, *a b*, p. 126 ... 126, 127
Cypridæ.
Cythere, Mueller ... 127
C. simplex, n. s., White & St. John, 1867 ... 127

16.

WHITE, C. A. Character of the Unconformability of the Iowa Coal-measures upon the Older Rocks. <Am. Jour. Sci., 2d ser., vol. xlv, pp. 331–334. New Haven, 1868.

Same. New Haven, 1868, 8vo., pp. 331–334. Twenty-five separates printed without title-page, covers, or repaging.

17.

WHITE, C. A. On Coal in Nebraska, with reference to a paragraph in the Geological Report of Dr. Hayden. <Am. Jour. Sci., 2d ser., vol. xlv., pp. 399–400. New Haven, 1868.

The paragraph referred to is on page 125 of the report of the Commissioner of the General Land Office for the year 1867.

18.

WHITE, C. A. Note on the shell-structure of certain Naiades. <Am. Jour. Sci., 2d ser., vol. xlv, pp. 400–401. New Haven, 1868.

The outer prismatic layer of the shell is noticed as a family character, not as a new discovery, as was supposed by Meek.

19.

WHITE, C. A. Note on "Cone-in-cone." <Am. Jour. Sci., 2d ser., vol. xlv, pp. 401–402. New Haven, 1868.

20.

WHITE, C. A. First and Second Annual Report of Progress by the State Geologist, and the Assistant and Chemist; on the Geological Survey of the State of Iowa; together with the substance of Popular Letters contributed to the Newspapers of the State during the years 1866 and 1867, in accordance with law; also extracts originally contributed to Scientific Journals as a part of the work of the Survey. pp. 1–284. Des Moines, 1868.

The brief first annual report (Entry No. 9) is reprinted in this volume, upon pages 5–8.

21.

WHITE, C. A. Lakes of Iowa, Past and Present. <American Naturalist, vol. ii, pp. 143–155. Salem, 1868.

Same. Salem, 1868, pp. 143–155. Thirty separates printed without title-page, covers, or repaging.

The Drift lakes, including the so-called walled lakes, are described, and the origin of the "walls" explained. Also the Bluff deposit of the Missouri River valley is shown to be the deposit of an ancient lake.

22.

WHITE, C. A. The Iowa Drift. <American Naturalist, vol. ii, pp. 615–616. Salem, 1869.

The derivation of the drift material from the underlying rocks, by their disintegration and comminution, is shown.

23.

WHITE, C. A. A trip to the Great Red Pipestone Quarry. <American Naturalist, vol. ii, pp. 644–653. Salem, 1869.

Same. Salem, 1869, 8vo., pp. 644–653. Thirty separates printed without title-page, covers, or repaging.

The quarry, the region, and the formation which contains the pipestone, are described.

24.

WHITE, C. A. Are Unios sensitive to light? <Am. Jour. Sci., 2d ser., vol. xlvii, pp. 280–281. New Haven, 1869.

An experiment is described, showing that the sensitiveness which Unios manifest when the sun's rays are suddenly intercepted by an opaque body, is due to an interruption of light rays, and not heat rays.

25.

WHITE, C. A. Announcement of the Existence of Cretaceous Rocks in Guthrie County, Iowa. <Proc. Amer. Ass. Adv. Sci., 17th Meeting. Chicago, 1868, vol. xvii, pp. 326–327. Cambridge, 1869.

26.

WHITE, C. A. Observation on the Red Quartzite Bowlders of Western Iowa; and their original ledges of Red Quartzite in Iowa, Dakota, and Minnesota. <Proc. Amer. Ass. Adv. Sci., 17th Meeting. Chicago, 1868, vol. xvii, pp. 340–342. Cambridge, 1869.

Same. Cambridge, 1869, pp. 340–342. Thirty separates printed without title page, covers, or repaging.

27.

WHITE, C. A. Report on the Geological Survey of the State of Iowa, to the Thirteenth General Assembly, January, 1870, Containing results of Examinations and Observations made within the years 1866, 1867, 1868, and 1869. By Charles A. White, M. D., Geological Corps; Charles A. White, State Geologist; Orestes H. St. John, Assistant; Rush Emery, Chemist. Vols. I and II. Des Moines, 1870.

CONTENTS OF VOLUME I.

	Page.
Introduction, including popular explanation of geological subjects	7–27
Part First: Physical Geography and Surface Geology; Four plates and two maps	28–166
Chapter I. Surface features	28–81
Chapter II. Surface deposits	82–121
Chapter III. Soils, &c	122–138
Chapter IV. Climate (by T. S. Parvin)	139–164
Part Second: General Geology; Three plates and three sections	165–294
Chapter I. Azoic, Lower Silurian, Upper Silurian, and Devonian systems	167–188
(*Smithia* [*Pachyphyllum*] *woodmani* [n. s., White, 1870] is described on p. 188.)	
Chapter II. Carboniferous system	189–230
Chapter III. Carboniferous system continued	231–263
Chapter IV. Carboniferous system concluded	264–284
Chapter V. Cretaceous system	285–294
Part Third: County and Regional Geology	295–381
Chapter I. Geology of Southwestern Iowa; and one section	296–381
Glossary	383–386
Index	387–391

CONTENTS OF VOLUME II.

Part First: County and Regional Geology	1–274
Chapter I. Geology of the Middle Region of Western Iowa and other counties (by O. H. St. John); with one plate and one section	1–200
Chapter II. Northwestern Iowa; One plate	201–232
Chapter III. Middle Region of Northern Iowa	233–253
Chapter IV. Geology of the Coal counties; One plate	254–274
Part Second: Mineralogy, Lithology, and Chemistry	275–402
Chapter I. Peat and Petroleum; One plate	275–292
Chapter II. Gypsum and other sulphates of the Alkaline Earths	293–306
Chapter III. Building materials, metals, and miscellaneous substances	307–342
Chapter IV. Chemist's Report (by Rush Emery).	
Section I. Rocks and minerals	345–354
Section II. Waters	354–357
Section III. Coals	357–397
Section IV. Peats	397–402
Appendices:	
Appendix A. Elevation in feet of points along the lines of Iowa railroads, both completed and projected (by the chief engineers of the respective roads	405–418
Appendix B. Catalogue of the Birds of Iowa (by J. A. Allen)	419–427
Appendix C. Government Surveys of the Public Lands (by C. W. Irish)	428–436
One Geological map of the State, colored.	

28.

WHITE, C. A. Natural Science in our Common Schools. <Iowa School Journal, vol. xii, pp. 1–4. Des Moines, 1870.

Methods of interesting school children in natural history are suggested.

29.

WHITE, C. A. Kjœkkenmœddings in Iowa. <American Naturalist, vol. iii, pp. 54–55. Salem, 1870.

This is the first public announcement of the fact that the shell-heaps of the western rivers are true kjœkkenmœddings.

30.

WHITE, C. A. Lilies of the Rocks. <American Naturalist, vol. iii, pp. 553–554. Salem, 1870.

A review of part of an article by G. Hinrichs, in the August No., vol. iii, of the Naturalist, entitled "Lilies of the Fields, of the Rocks, and the Clouds." This note is signed "Zeologicus."

31.

WHITE, C. A. Prairie Fires. <American Naturalist, vol. v, pp. 68–70. Salem, 1871.

An incident of personal experience related.

32.

WHITE, C. A. Albino Flowers. <American Naturalist, vol. v, pp. 161–162. Salem, 1871.

It is observed that a certain cluster of the common field clover produced white flowers one year, and those of the ordinary red color the next. Also, that a specimen of white *Liatris* was observed, the latter being deemed important because the rose-red color is common to the whole genus.

33.

WHITE, C. A. [Remarks on the "Geological History of the Gulf of Mexico" by Prof. E. W. Hilgard.] <American Naturalist, vol. v, pp. 519–520. Salem, 1871.

These remarks were made before the American Association for the Advancement of Science, at the 20th (Indianapolis) meeting, 1871, with reference to the paper above cited.

34.

WHITE, C. A. [Remarks on the homologies of the Carpal and Tarsal bones in Birds.] <American Naturalist, vol. v, p. 525. Salem, 1871.

These remarks were made before the American Association for the Advancement of Science, 20th meeting (Indianapolis), with reference to a paper read by E. S. Morse, "On the Carpal and Tarsal bones of Birds."

35.

WHITE, C. A. Mammoth Cave. <University Reporter, [a college paper of the Iowa State University.] 4to. Vol. iv, pp. 81–83. Iowa City, 1872.

An account of a visit to Mammoth Cave, Kentucky, in company with the American Association for the Advancement of Science.

36

WHITE, C. A. Manual of Physical Geography and Institutions of the State of Iowa. 4to. pp. 1–85, pls. i–iii and figs. Davenport, 1873.

This book was prepared for use in the schools of the State. It embraces an account of the history, constitution, and school laws of the State; its educational, charitable, and penal institutions, land surveys, elections, taxes, &c. In 1883 an edition was issued purporting to be the 15th and also to be revised, but it has never been revised by the author since the first edition.

37.

WHITE, C. A. Woodpeckers Tapping Sugar Trees. <American Naturalist, vol. vii, p. 496. Salem, 1873.

Woodpeckers were observed to peck holes in the bark of young and sound sugar maples, evidently to get the sap.

38.

WHITE, C. A. Kjœkkenmœddings de l'Amérique du nord. <Congrès International d'Anthropologie et d'Archéologie. Préhistoriques; Compte rendu de la cinquième session à Bologne, 1871. pp. 379–389. Bologna (Italy), 1873.

Same. Bologna (Italy), 1873. 8vo, pp. 15. Thirty separates printed with title-page and repaging.

This paper embraces a general review of the subject of shell-heaps in North America as known up to that date.

39.

WHITE, C. A. On Spontaneous fission? in Zaphrentis. <Amer. Jour. Sc., 3d ser., vol. v., p. 72. New Haven, 1873.

A specimen of *Zaphrentis spinulifera*, Hall is described, which seemed to be a case of spontaneous fission. The author now thinks it probable that it was the result of a twin polyp, or that the fission took place at a very early stage in the formation of the corallite

40.

WHITE, C. A. On the Eastern Limit of Cretaceous Deposits in Iowa. <Proc. Amer. Ass. Adv. Sci. 21st meeting (Dubuque), 1872, vol. xxi, pp. 187–192. Cambridge, 1873.

Same. Cambridge, 1873. 8vo. pp. 187–192. Fifty separates printed without title-page, covers, or repaging.

The discovery is announced of Cretaceous fossils in the drift or glacier-disturbed Cretaceous deposits in Howard, Black Hawk, and Johnson Counties, Iowa; showing that the Cretaceous deposits once extended as far eastward as Eastern Iowa and Southeastern Minnesota.

41.

WHITE, C. A. The proposed genus Anomalodonta of Miller identical with the earlier Megaptera of Meek. <Amer. Jour. Sci., 3d ser., vol. viii, pp. 218–219. New Haven, 1874.

Meek's claim to priority is defended against that of Miller. The note bears only the initials of the author, "C. A. W."

42.

WHITE, C. A. Artificial Shell-heaps of Fresh-water Mollusks. <Proc. Amer. Ass. Adv. Sci., 22d meeting, Portland, 1873, pp. 133–137. Salem, 1874.

Same. Salem, 1874. 8vo. pp. 133–137. Fifty separates printed without title-page, covers, or repaging.

It is herein shown that the fresh-water mollusks were extensively used as food by the aboriginal inhabitants.

43.

WHITE, C. A. Preliminary Report upon Invertebrate Fossils collected by the Expeditions of 1871, 1872, and 1873, with Descriptions of New Species. <Engineer Department, U. S. Army. Geographical and Geological Explorations and Surveys west of the 100th meridian. First Lieut. George M. Wheeler, Corps of Engineers, in charge. pp. 1–27. Washington, 1874.

Thirty-nine species are described as new, and five others are noticed. They are all redescribed and figured in part i, vol. iv, Report upon Geographical and Geological Explorations and Surveys West of the 100th Meridian. See entry No. 48. *Anchura nuptialis* is a Cretaceous species, and herein wrongly referred to the Jurassic.

LOWER SILURIAN

PRIMORDIAL PERIOD.

Plantæ.

	Page.
Oruziana, d'Orbigny	5
O. linnarssoni, n. s., White, 1874	5
O. rustica, n. s., White, 1874	5-6

Animalia.

Brachiopoda.	
Acrotreta, Kutorga	6
A.? subsidua, n. s., White, 1874	6
Trematis, Sharpe	6
T. pannulus, n. s., White, 1874	6
Pteropoda.	
Hyolithes, Eichwald	6
H. primordialis, Hall?	6
Crustacea.	
Agnostus, Brongniart	7
A. interstricta, n. s., White, 1874	7
Olenellus, Hall	7
O. gilberti, Meek MSS	7-8
O. powelli, Meek MSS	8

CANADIAN PERIOD.

Hydrozoa.	
Phyllograptus, Hall	9
P. loringi, n. s., White, 1874	9
Brachiopoda.	
Acrotreta, Kutorga	9
A. pyscidicula, n. s., White, 1874	9
Lingula, Bruguière	9
L.? manticula, n. s., White, 1874	9-10
Strophomena, Rafinesque	10
S. fontinalis, n. s., White, 1874	10
Gasteropoda.	
Bellerophon, Montfort	10
B. allegoricus, n. s, White, 1874	10
Cephalopoda.	
Orthoceras, Breynius	10
O. colon, n. s., White, 1874	10-11
Crustacea.	
Leperditia, Rouault	11
L. bivia, n. s., White, 1874	11
Megalaspis, Angelin	11
M. belemnurus, n. s., White, 1874	11-12
Dicellocephalus, Owen	12
D. flagricaudus, n. s., White, 1874	12

TRENTON PERIOD.

Hydrozoa.	
Graptolithus, Linnæus	12
G. (Diplograptus) hypniformis, n. s., White, 1874	12-13
G. qua(r)drimucronatus, Hall?	13
G. (Climacograptus?) ramulus, n. s., White, 1874	13
Rhynchonella, Fischer	14
R. argenturbica, n. s., White, 1874	14

CARBONIFEROUS.

SUBCARBONIFEROUS PERIOD.

Polypi.	
Favosites, Lamarck	15
F. whitfieldi, White & Whitfield MSS	15
Blastoidea.	
Granatocrinus, Troost	15
G. lotoblastus, n. s., White, 1874	15

Page.

Crinoidea.
Platycrinus, Miller 15
Platycrinus, ——? White, 1874 15–16
Actinocrinus, Miller 16
A. viatious, n. s., White, 1874 16
Brachiopoda.
Spirigera, d'Orbigny 16
S. monticola, n. s., White, 1874 16

CARBONIFEROUS PERIOD.

Echinodermata.
Archæocidaris, McCoy 17
A. trudifer, n. s., White, 1874 17–18
Polyzoa.
Glauconoma, Goldfuss 18
G. nereidis, n. s., White, 1874 18–19
Polypora, McCoy 19
P. stragula, n. s., White, 1874 19
Brachiopoda.
Chonetes, Fischer 19
C. platynota, n. s., White, 1874 19
Rhynchonella, Fischer 19
R. wasatchensis, n. s., White, 1874 19–20
R. metallica, n. s., White, 1874 20
Spirifer, Sowerby 20
S. (Martinia) glaber var. *contracta*, Meek & Worthen 20–21
Spiriferina, d'Orbigny 21
S. spinosa, Norwood & Pratten, var. *campestris*, White, 1874 21
Dielasma, King 21
D.? bovidens, Morton, sp 21
Conchifera.
Aviculopecten, McCoy 21
A. coreyana, n. s., White, 1874 21–22
Monopteria, Meek & Worthen 22
M. marian, n. s., White, 1874 22
Gasteropoda.
Macrocheilus, Phillips 22
M. angulifera, n. s., White, 1874 22–23
Dentalium, Linnæus 23
D. canna, n. s., White, 1874 23

MESOZOIC.

JURASSIC PERIOD.

Conchifera.
Camptonectes, Agassiz 23
C. stygius, n. s., White, 1874 23
Gasteropoda.
Neritina, Lamarck 24
N. phaseolaris, n. s., White, 1874 24
Anchura, Conrad 24
A. nuptialis, n. s., White, 1874 24

CRETACEOUS PERIOD.

Conchifera.
Pinna, Linnæus 24
P. petrina, n. s., White, 1874 24–25
Camptonectes, Agassiz 26
C. platessa, n. s., White, 1874 25
Inoceramus, Sowerby 25
I. dimidius, n. s., White, 1874 25–26
Leiopistha, Meek 26
Subgenus *Psilomya*, Meek 26
L. (Psilomya) meekii, n. s., White, 1874 26
Gasteropoda.
Cassiope, Coquand 27
C. whitfieldi, n. s., White, 1874 27

44.

WHITE, C. A. On the Equivalency of the Coal-Measures of the United S Europe. <Proc. Amer. Ass. Adv. Sci., 23d Meeting (Hartford), 1874, pp Salem, 1875.

Same. Salem, 1875. 8vo, pp. 35–38. Thirty separates printed without t covers, or repaging.

An affirmative opinion is expressed.

45.

WHITE, C. A. The Great Western Exploring Parties and their Progress. Daily Advertiser (newspaper), vol. 126, No. 91. Boston, October 15, 18

This is the first of a series of three articles written from the field. This one v from Southern Wyoming, describing the country, and mentioning Powell's plan the arid region surveyed into irregular-shaped ranches, and not by the rectangula use in the humid regions.

46.

WHITE, C. A. The Far West. <Boston Daily Advertiser (newspaper), No. 108. Boston, November 4, 1875.

The second of a series of articles written from the field. This one is from Nort describing the vegetable products of that region.

47.

WHITE, C. A. The Far West. <Boston Daily Advertiser (newspaper), No. 115. Boston, November 12, 1875.

The third and last of a series of three articles written from the field. This w from Northern Utah, describing the animals of that region.

48.

WHITE, C. A. Report upon the Invertebrate Fossils collected in portions of Utah, Colorado, New Mexico, and Arizona, by Parties of the Expedition 1872, 1873, and 1874. <Report upon Geographical and Geological Exp and Surveys West of the 100th Meridian, in charge of First Lieut. Geo. M. Corps of Engineers, U. S. Army. 4to. vol. iv. part i, Paleontology. I pls. i–xxi. Washington, 1875.

Same. Washington: Government Printing Office, 1875. 4to, pp. 219, and 21 illustrations. Two hundred and fifty separates printed and bound covers, and 30 copies printed and bound separately in boards for the aut a different imprint upon the back.

This report comprises descriptions and illustrations of fossils and some general el upon the periods which they represent. One hundred and seventy-five species ar and illustrated, from the Primordial, Silurian, Carboniferous, Jurassic, Cretaceou tiary rocks, the majority of which were formerly known. A few, however, are scribed for the first time, but the new forms of these collections were mostly descr preliminary report (Entry No. 43). The genus *Lispodesthes* is here proposed.

LOWER SILURIAN AGE.

PRIMORDIAL PERIOD.

Plantæ.

Cryptogamia.

Thallogenes.

Cruziana, d'Orbigny, 1842.....

C. linnarssoni, White, 1874, pl. i, figs. 2 *a–c*.....

C. rustica, White, 1874, pl. i, figs. 1 *a, b*.....

	Page.
Animalia.	
Brachiopoda.	
Acrotreta, Kutorga, 1848	34
A.? subsidua, White, 1874, pl. i, figs. 3 *a–d*	34–36
Trematis, Sharpe, 1847	36
T. annulus, White, 1874, pl. i, figs. 4 *a* and *b*	36–37
Gasteropoda.	
Hyolithes, Eichwald, 1840	37
H. primordialis? Hall? 1861, pl. i, figs. 5 *a–e*	37–38
Crustacea.	
Agnostus, Brongniart, 1821	38
A. interstrictus, White, 1874, pl. ii, figs. 5 *a* and *b*	38–40
Conocoryphe, Corda, 1847	40
Subgenus *Ptychoparia*, Corda, 1847	40
C. (Ptychoparia) kingii, Meek, 1870, pl. ii, figs. 2 *a–c*	40–43
Asaphiscus, Meek, 1872	43
A. wheeleri, Meek, 1872, pl. ii, figs. 1 *a–f*	43–44
Olenellus, Hall, 1861	44
O. gilberti, Meek, MSS., 1874, pl. ii, figs. 3 *a–e*	44–46
O. howelli, Meek, MSS., 1874, pl. ii, figs. 4 *a* and *b*	47–48
Vestigia, White, 1875, pl. i, figs. 6, *a* and *b*	49
CANADIAN PERIOD.	
Rhizopoda.	
Receptaculites, Defrance, 1827	50
Receptaculites —— (?)	50
Hydrozoa.	
Phyllograptus, Hall, 1858	51
P. loringi, White, 1874, pl. iii, figs. 1 *a* and *b*	51–52
Brachiopoda.	
Lingula, Bruguière, 1789	52
L.? manticula, White, 1874, pl. iii, figs. 2 *a* and *b*	52–53
Acrotreta, Kutorga, 1848	53
A. pyxidicula, White, 1874, pl. iii, figs. 3 *a* and *b*	53–54
Strophomena, Rafinesque, 1827	54
S. fontinalis, White, 1874, pl. iii, figs. 4 *a–e*	54–55
Orthis, Dalman, 1828	53
O. electra, Billings (?)	55
Gasteropoda.	
Bellerophon, Montfort, 1808	55
B. allegorious, White, 1874, pl. iii, figs. 6 *a–e*	55–56
Cephalopoda.	
Orthoceras, Breynius, 1732	56
Subgenus *Camaroceras*, Conrad, 1842	56
O. (Camaroceras) colon, White, 1874, pl. iii, figs. 5 *a–d*	56–57
Cyrtoceras, Goldfuss, 1833	57
C. ——(?), White, 1875	57–58
Crustacea.	
Leperditia, Rouault, 1851	58
L. bivia, White, 1874, pl. iii, figs. 7 *a–d*	58–59
Megalaspis, Angelin, 1854	59
M. belemnurus, White, 1874, pl. iii, fig. 9	59–60
Dicellocephalus, Owen, 1852	60
D.? flagricaudus, White, 1874, pl. iii, figs. 8 *a* and *b*	60–61
TRENTON PERIOD.	
Hydrozoa.	
Graptolithus, Linnæus, 1736	62
Subgenus *Climacograptus*, Hall, 1865	62
G. (Climacograptus) ramulus, White, 1874, pl. iv, figs. 3 *a–c*	62–63
Subgenus *Diplograptus*, M'Coy, 1850	63
G. (Diplograptus) hypniformis, White, 1874, pl. iv, figs. 4 *a* and *b*	63–64
G. (Diplograptus) pristis, Hall (?), 1847, pl. iv, figs. 2 *a* and *b*	65
G. quadrimucronatus, Hall (?), 1865, pl. iv, figs. 1 *a* and *b*	65–66
Actinozoa.	
Monticulipora, d'Orbigny, 1850	66
M. dalli, Edwards & Haime, 1851, pl. iv, fig. 5	66–67

	Page.
Favosites, Lamarck, 1816	67
F. ——(?) White, 1875	67
Favistella, Hall, 1847	67
F. stellata, Hall, 1847, pl. iv, figs. 6 *a–c*	67–68
Zaphrentis, Rafinesque et Clifford, 1820	68
Z. —— (?), White, 1875	68
Brachiopoda.	
Strophomena, Rafinesque, 1827	69
S. flitexta, Hall, 1847, pl. iv, fig. 8	69–70
Leptæna, Dalman, 1828	70
L. sericea, Sowerby (?), pl. iv, fig. 7	70
Orthis, Dalman, 1828	70
O. occidentalis, Hall, 1847, pl. iv, figs. 2 *a* and *b*	70–72
O. testudinaria, Dalman (?)	72
O. plicatella, Hall (?), 1847, pl. iv, figs. 10 *a–d*	72–74
O. biforata, Schlotheim, var. *lynx*., White, 1875, pl. iv, figs. 9 *a* and *b*	74–75
Rhynchonella, Fischer, 1809	75
R. argenturbica, White, 1874, pl. iv, figs. 12 *a–e*	75–76
Conchifera.	
Modiolopsis, Hall, 1847	76
M. —— (?), White, 1875	76
Gasteropoda.	
Maclurea, Le Sueur, 1818	77
M. —— (?), White, 1875	77
Raphistoma, Hall, 1847	77
R. trochiscus, Meek, 1870, pl. iv, figs. 13 *a–c*	77–78
CARBONIFEROUS AGE.	
SUBCARBONIFEROUS PERIOD.	
Actinozoa.	
Favosites, Lamarck, 1816	79
F. divergens, White & Whitfield, 1862, pl. v, fig. 4	79–80
Syringopora, Goldfuss, 1826	80
S. harveyi, White (?)	80
Echinodermata.	
Granatocrinus, Troost, 1850	80
G. lotoblastus, White, 1874, pl. v, figs. 3 *a* and *b*	80–81
Platycrinus, Miller, 1821	81
P. —— (?), White, 1875, pl. v, fig. 2	81–82
Actinocrinus, Miller, 1821	82
A. viaticus, White, 1874, pl. v, fig. 1	82–83
Brachiopoda.	
Productus, Sowerby, 1812	83
P. parvus, M. & W., 1866, pl. v, figs. 6 *a* and *b*	83–84
Strophomena, Rafinesque, 1827	85
S. rhomboidalis, Wilckins, sp., 1767, pl. v, fig. 5	85–86
Spirifer, Sowerby, 1815	86
S. centronatus, Winchell, 1865, pl. v, figs. 8 *a–c*	86–87
S. striatus, Martin, sp., pl. v, fig. 10 *a*	88
S. extenuatus, Hall, 1858, pl. v, figs. 9 *a–d*	88–90
Subgenus *Martinia*, McCoy, 1844	90
S. (*Martinia*) *peculiaris*, Shumard, 1855, pl. v, figs. 7 *a* and *b*	90–91
Spirigera, d'Orbigny, 1847	91
S. monticola, White, 1874, pl. v, figs. 11 *a–d*	91–92
S. obmaxima, McChesney, 1860, pl. v, fig. 12	92–93
Terebratula, Llwhyd, 1698	93
Subgenus *Dielasma*, King, 1859	93
T. (*Dielasma*) *burlingtonensis*, White, 1860	93
Conchifera.	
Conocardium, Brown, 1835	94
C. —— (?), White, 1875	94
Gasteropoda.	
Euomphalus, Sowerby, 1815	94
E. luxus, n. s., White, 1875, pl. v, figs. 13 *a* and *b*	94–95

Page.

CARBONIFEROUS PERIOD.

Protozoa.

Rhizopoda.

Fusulina, Fischer, 1837 96

F. cylindrica, Fischer, 1837, pl. vi, figs. 6 *a* and *b* 96–98

Actinozoa.

Chætetes, Fischer, 1837 98

C. milleporaceus, Troost, sp., 1849 ?, pl. vi, fig. 2 *a* 98–99

Rhombipora, Meek, 1872 99

R. lepidodendroides, Meek, 1872, pl. vi, figs. 5 *a–d* 99–100

Syringopora, Goldfuss, 1826 100

S. multattenuata, McChesney (?) 100–101

Zaphrentis, Rafinesque & Clifford 101

Z. excentrica, Meek, 1872, pl. vi, fig. 3 *a* 101

Lophophyllum, Edwards & Haime, 1850 101

L. proliferum, McChesney, sp., var. *sauridens*, White, 1875, pl. vi, figs. 4 *a–d* 101–103

Lithostrotion, Fleming, 1828 103

L. whitneyi, Meek, 1875, pl. vi, figs. 1 *a–c* 103

Echinodermata.

Archæocidaris, McCoy, 1844 104

A. ornatus, Newberry, 1861, pl. vi, fig. 7 104

A. trudifer, White, 1874, pl. vi, figs. 8 *a* and *b* 104–105

Polyzoa.

Glauconome, Goldfuss, 1826 105

G. nereidis, White, 1874, pl. vii, figs. 5 *a–e* 105–107

Synocladia, King, 1849 107

S. biserialis, Swallow, 1858, pl. vii, figs. 3 *a–e* 107–108

Polypora, McCoy, 1844 108

P. stragula, White, 1874, pl. vii, figs. 4 *a* and *b* 108–109

Brachiopoda.

Productus, Sowerby, 1812 109

P. costatus, Sowerby (?), 1827, pl. viii, figs. 2 *a–d* 109–111

P. semireticulatus, Martin, sp., 1809, pl. viii, figs. 1 *a–e* 111–113

P. prattenianus, Norwood, 1854, pl. vii, figs. 1 *a–c* 113–114

P. punctatus, Martin, sp., 1809, pl. vii, figs. 2 *a–c* 114–116

P. nebrascensis, Owen, 1852, pl. viii, figs. 3 *a–d* 116–117

P. longispinus, Sowerby, 1814, pl. viii, figs. 5 *a–d* 118–119

P. muricatus, Norwood & Pratten, 1854, pl. viii, figs. 4 *a–e* 120

P. mexicanus, Shumard (?), 1858, pl. viii, figs. 6 *a–c* 120–121

Chonetes, Fischer, 1837 121

C. platynota, White, 1874, pl. ix, figs. 6 *a–e* 121–122

C. granulifera, Owen, 1855, pl. ix, figs. 8 *a–c* 122–123

C. mesoloba, Norwood & Pratten, 1854, pl. ix, fig. 7 *a* 123

Hemipronites, Pander, 1830 124

H. crinistria, Phillips, sp., pl. x, fig. 9 *a* 124–125

Orthis, Dalman, 1828 125

O. pecosii, Marcou, 1858, pl. ix, figs. 5 *a–e* 125–126

Meekella, White & St. John, 1867 126

M. striatocostata, Cox, sp., 1857, pl. ix, figs. 4 *a–e* 126–128

Rhynchonellidæ.

Rhynchonella, Fischer, 1809 128

R. uta, Marcou, sp., 1858, pl. ix, figs. 2 *a–c* 128–129

R. metallica, White, 1874, pl. x, figs. 10 *a–d* 129–130

R. wasatchensis, White, 1874, pl. ix, figs. 3 *a–d* 130–131

R. rockymontana, Marcou, 1858, pl. ix, figs. 1 *a–d* 131–132

Spirifer, Sowerby, 1815 132

S. cameratus, Morton, 1836, pl. x, figs. 1 *a–d* 132–134

S. striatus, Martin, sp 134

S. rockymontanus, Marcou, 1858, pl. xi, figs. 9 *a–d* 134–135

Subgenus *Martinia*, McCoy, 1844 135

S. (Martinia) planoconvexus, Shumard, 1855, pl. x, figs. 3 *a–c* 135–136

S. (Martinia) glaber var. *contracta*, Meek & Worthen, 1866, pl. x, figs. 2 *a–c* 136–138

Spiriferina, d'Orbigny, 1847 138

S. kentuckensis, Shumard, 1855, pl. x, figs. 4 *a–c* 138–139

S. octoplicata, Sowerby, 1827, pl. x, figs. 8 *a–c* 139–141

Retzia, King, 1850 .....

R. mormonii, Marcou, 1858, pl. x, figs. 7 *a–c* .....

	Page.
Spirigera, d'Orbigny, 1847	141
S. subtilita, Hall, 1852, pl. x, figs. 6 *a–c*	141–143
S. planosulcata, Phillips, sp. 1836, pl. x, figs. 5 *a–d*	143–144
Terebratulidæ.	
Terebratula Llhwyd, 1698	144
Subgenus *Dielasma*, King, 1859	144
T. (Dielasma) bovidens, Morton, 1836, pl. xi, figs. 10 *a–e*	144–146
Mollusca vera.	
Conchifera.	
Monomyaria.	
Pectinidæ.	
Aviculopecten, McCoy, 1852	146
A. occidentalis, Shumard, 1855, pl. xii, figs. 8 *a* and *b*	146–147
A. coreyanus, White, 1874, pl. xi, figs. 1 *a* and *b*	147–148
A. mccoyi, M. & H., 1864, pl. xi, fig. 2 *a*	149
A. interlineatus, M. & W., 1860, pl. xi, fig. 3 *a*	149–150
Pinnidæ.	
Pinna, Linnæus, 1758	151
P. peracuta, Shumard (?), pl. xi, fig. 5 *a*	151
Pteriidæ.	
Monopteria, M. & W., 1866	151
M. marian, White, 1874, pl. xi, figs. 4 *a–c*	151–152
Myalina, de Koninck, 1844	152
Myalina (?), White, 1875	152
M.? swallovi, McChesney, pl. xi, fig. 8 *a*	152
Bakevellia, King, 1848	153
B. parva, M. & H., 1858, pl. xi, figs. 7 *a* and *b*	153
Dymyaria.	
Trigonidæ.	
Schizodus, King, 1844	154
S. wheeleri, Swallow, 1862, pl. xi, figs. 6 *a* and *b*	154
Allorisma, King, 1850	155
A. subcuneata, var. M. & H., pl. xii, figs. 7 *a* and *b*	155
Gasteropoda.	
Prosopocephala.	
Solenoconcha.	
Dentaliidæ.	
Dentalium, Linnæus, 1740	156
D. canna, White, 1874, pl. xii, figs. 6 *a* and *b*	156
Diœca.	
Rhiphidoglossa.	
Dicranobranchia.	
Bellerophontidæ.	
Bellerophon, Montfort, 1808	157
B. crassus, M. & W., 1860, pl. xii, fig. 1 *a*	157
Podophthalma.	
Euomphalidæ.	
Euomphalus, Sowerby, 1815	158
E. pernodosus, M. & W., 1870, pl. xii, figs. 2 *a* and *b*	158
Pectinibranchiata.	
Tænioglossa.	
Naticidæ.	
Naticopsis, McCoy, 1844	159
N. nana, M. & W., 1866, pl. xii, figs. 4 *a* and *b*	159
Capulidæ.	
Platyceras, Conrad, 1840	159
P. nebrascense, Meek, 1872, pl. xii, figs. 5 *a–d*	159–160
Macrocheilidæ.	
Macrocheilus, Phillips, 1841	160
M. anguliferus, White, 1874, pl. xii, figs. 3 *a–f*	160–161
Cephalopoda.	
Tetrabranchiata.	
Goniatitidæ.	
Goniatites, de Haan, 1825	161
Nautilidæ.	
Nautilus, Breynius, 1732	161

Page.

MESOZOIC AGE.

JURASSIC PERIOD.

Radiata.
Echinodermata.
Crinoidea.
Pentacrinidæ.
Pentacrinus, Miller, 1821 162
P. asteriscus, M. & H., 1864, pl. xiii, figs. 6 *a*, *b* 162–163
Mollusca.
Conchifera.
Monomyaria.
Ostreidæ.
Ostrea, Linnæus, 1758 163
O. strigilecula, n. s., White, 1875, pl. xiii, figs. 3 *a–d* 163–164
Pectinidæ.
Camptonectes, Meek (Agassiz), 1864 164
C. stygius, White, 1874, pl. xiii, figs. 2 *a–c* 164–165
C. bellistriatus, M. & H. 165
Pteridæ.
Inoceramus, Sowerby, 1814 166
I. crassalatus, n. s., White, 1875, pl. xiii, figs. 4 *a–c* 166
Dimyaria.
Trigoniidæ.
Myophoria, Brown, 1830.
M. ambilineata, n. s., White, 1875, pl. xiii, figs. 5 *a* and *b* 166–167
Trigonia, Bruguière, 1789 167
T. —— (?), White, 1875 167
Gasteropoda.
Diœca.
Rhipidoglossa.
Podophthalma.
Neritidæ.
Neritina, Lamarck, 1809 167
N.? phaseolaris, White, 1874, pl. xiii, figs. 1 *a–c* 167–168

CRETACEOUS PERIOD.

Mollusca.
Molluscoidea.
Brachiopoda.
Lyopomata.
Lingulidæ.
Lingula, Bruguière, 1792 169
L. subspatulata, H. & M., 1856, pl. xv, fig. 4 *a* 169
Mollusca vera.
Conchifera.
Monomyaria.
Ostreidæ.
Ostrea, Linnæus, 1[7]58 170
O. cortex, Conrad, 1857, pl. xv, figs. 2 *a–c* 170
O. prudentia, n. s., White, 1875, pl. xiv, figs. 2 *a–d* 171
Gryphæa, Lamarck, 1801 171
G. pitcheri, var. Morton, pl. xvii, figs. 1 *a–f* 171–173
Exogyra, Say, 1819 173
E. ponderosa, Rœmer, 1852, pl. xiv, figs. 1 *a–c* 173–173
E. laeviuscula, Rœmer, 1852, pl. xvii, figs. 2 *a–d* 173–174
E. costata, Say, var. *fluminis*, White, 1875, pl. xvii, figs. 3 *a–d* 174–175
Pectinidæ.
Camptonectes, Meek (Agassiz), 1864 176
C. platessa, White, 1874, pl. xvii, fig. 5 *a* 176
Limidæ.
Lima, Bruguière, 1791 176
L. wacoensis, Rœmer, 1852, pl. xvii, figs. 4 *a–c* 176–177
Pteridæ.
Inoceramus, Sowerby, 1814 ..... 1—
I. problematicus, Schlotheim sp., 1820, pl. xvi, fig. 3 *a* .....
I. fragilis, Hall & Meek, 1856, pl. xv, fig. 3 *a* .....

Page.

I. flaccidus, n. s., White, 1875, pl. xvi, figs. 1 *a* and *b* 178–179
I. deformis, Meek, 1872, pl. xv, figs. 1 *a* and *b* 179–180
I. barabini, Morton, 1834, pl. xvi, fig. 4 *a* 180–181
I. dimidius, White, 1874, pl. xvi, figs. 2 *a–d* 181–182
Pinnidæ.
Pinna, Linnæus, 1758 182
P. petrina, White, 1874, pl. xiii, figs. 7 *a* and *b* 182–183
Dymyaria.
Arcidæ.
Idonearca, Conrad, 1862 183
I. depressa, n. s., White, 1875, pl. xviii. figs. 13 *a* and *b* 183–184
Lucinidæ.
Lucina, Bruguière, 1792 184
L. subundata, Hall & Meek, 1856, pl. xviii, fig. 12 *a* 184
Glossidæ.
Veniella, Stoliczska, 1870 185
V. goniophora, Meek, 1875 185
Mactridæ.
Mactra, Linnæus 185
M.? incompta, n. s., White, 1875, pl. xvii, fig. 6 *a* and *b* 185
Anatinidæ.
Leiopistha, Meek, 1864 186
Subgenus *Psilomya*, Meek, MSS., 1874 186
L. (Psilomya) meeki, White, 1874, pl. xviii, figs. 14 *a–d* 186–187
Subgenus *Cymella*, Meek, 1864 187
L. (Cymella) undata, M. & H., sp., 1856, pl. xviii, fig. 15 *a* 187
Corbulidæ.
Corbula, Bruguière, 1792 188
C. nematophora, Meek, 1872, pl. xvii, figs. 7 *a–c* 188–189
Gasteropoda.
Diœca.
Rhiphidoglossa.
Neritidæ.
Neritina, Lamarck, 1809 189
Subgenus (*Velatella*) Meek, 1872 189
N. (Velatella) carditoides, Meek, 1872, pl. xviii, figs. 7 *a–c* 189–190
Pectinibranchiata.
Tœnioglossa.
Aporrhaidæ.
Anchura, Conrad, 1860 190
A.? fusiformis, Meek, MSS., 1874, pl. xviii, fig. 4 *a* 190–191
* *Lispodesthes*, n. g., White, 1875 191
L. nuptialis, White, 1874, pl. xviii, figs. 3 *a* and *b* 192
L. lingulifera, n. s., White, 1875, pl. xviii, figs. 2 *a* and *b* 192–193
Tecturidæ.
Anisomyon, M. & H., 1860 193
A. borealis, Morton, sp., 1842, pl. xviii, figs. 9 *a* and *b* 193–194
A. centrale, Meek, 1870, pl. xviii, figs. 8 *a* and *b* 194–195
Turritellidæ.
Turritella, Lamarck, 1801 195
T. uvasana, Conrad, 1856, pl. xviii, figs. 11 *a* and *b* 195
Cassiope, Coquand, 1865 196
C. whitfieldi, White, 1874, pl. xviii, fig. 1 *a* 196
Eulimella, Forbes, 1846 197
E. funicula, Meek, 1872, pl. xviii, fig. 6 *a* 197
Pyramidellidæ.
Turbonilla, Leach, 1825 197
Subgenus *Chemnitzia*, Conrad, 1860 197
T. (Chemnitzia) melanopsis, Conrad? pl. xviii, fig. 10 *a* 197–198
Toxoglossa.
Admetidæ.
Admete, Möller, 1842 198
Subgenus *Admetopsis*, Meek, 1872 198
A. (Admetopsis) gregaria, Meek, 1872, pl. xviii, figs. 5 *a* and *b* 198–199

* λισσος, smooth, and ἑσθης, a garment.

Page.

Cephalopoda.
Tetrabranchiata.
Baculitidæ.
Baculites, Lamarck, 1801 199
B. ovatus, Say, pl. xix, figs. 4 *a–c*, and 5 *a–c* 199–200
Scaphitidæ.
Scaphites, Parkinson, 1811 200
S. warreni, M. & H., 1860, pl. xix, fig. 3 *a* 200–201
Ammonitidæ.
Ammonites, Bruguière, 1789 201
A. laviannus, n. s., White, 1875, pl. xix, figs. 1 *a* and *b* 201–202
A. placenta, DeKay, var. *intercalaris* M. & H. 202
Buchiceras, Hyatt, 1875 202
B. swallovi, Shumard, 1860, pl. xx, figs. 1 *a–c* 202–203
Turrilitidæ.
Helicoceras, d'Orbigny, 1842 203
H. parietes, n. s., White, 1875, pl. xix, figs. 2 *a–d* 203–204
Articulata.
Vermes.
Tubicola.
Serpulidæ.
Serpula, Linnæus, 1758 205
S. intrica, n. s., White, 1875, pl. xv, fig. 5 *a* 205

CENOZOIC AGE.

TERTIARY PERIOD.

Mollusca.
Conchifera.
Dimyaria.
Unionidæ.
Unio, Retzius, 1788 206
U. vetustus, Meek, 1860, pl. xxi, figs. 12 *a–d* 206–207
Cyrenidæ.
Cyrena, Lamarck, 1818 207
Subgenus *Veloritina*, Meek, 1872 207
C. (Veloritina) durkeei, Meek, 1870, pl. xxi, figs. 13 *a* and *b* 207–208
Sphærium, Scopoli, 1777 208
Sphærium —— (?), White, 1875 208
Gasteropoda.
Pulmonifera.
Basommatophora.
Limnæidæ.
Planorbis, Guettard, 1756 209
P. utahensis, Meek, 1860, pl. xxi, fig. 8 *a* 209
Planorbis —— (?), White, 1875 210
Physidæ.
Physa, Draparnaud, 1801 210
P. bridgerensis, Meek ? 1872, pl. xxi, fig. 2 *a* 210
P. pleromatis, n. s., White, 1875, pl. xxi, figs. 1 *a* and *b* 211
Geophila.
Helicidæ.
Helix, Linnæus, 1758 211
H. leidyi, H. & M., 1856, pl. xxi, figs. 3 *a–c* 211
Diœca.
Pectinibranchiata.
Tanioglossa.
Melaniidæ.
Goniobasis, Lea, 1862 212
G. tenuicarinata, M. & H., 1857, pl. xxi, figs. 10 *a* and *b* 212
G. tenera, Hall, sp., 1845, pl. xxi, figs. 11 *a–c* 212–213
G. nebrascensis, M. & H., 1856, pl. xxi, figs. 9 *a–c* 213
Viviparidæ.
Viviparus, Montfort, 1810 .....
V. trochiformis, M. & H., 1856, pl. xxi, figs. 4 *a–c* .....
V. trochiformis, var. White, 1875, pl. xxi, figs. 5 *a* and *b* .....

Page.
V. ionicus, n. s., White, 1875, pl. xxi, figs. 6 *a* and b 215
Viviparus —— (?), White, 1875, pl. xxi, figs. 7 *a* and *b* 215
Articulata.
Crustacea.
Ostracoda.
Cypridinidæ.
Cypris, Müller, 1785 216
Cypris —— (?), White, 1875 216

49.

WHITE, C. A. Invertebrate Paleontology of the Plateau Province, together with notice of a few species from localities beyond its limits in Colorado. <United States Geological and Geographical Survey of the Territories: Report on the Geology of the Uintah Mountains. By J. W. Powell. 4to, pp. 74–135. Washington, 1876.

Same. Washington, 1876. 4to, pp. 74–135. Fifty separates printed without title-page, covers, or repaging.

This memoir embraces some general geological discussions, catalogues of fossils, and descriptions of 48 new species.

In subsequent works the author has referred to the Laramie group some of the fossils herein assigned, respectively, to the Cretaceous and Tertiary. Most of the species have since been illustrated by the author in various works.

General observations, pp. 75–87.

Catalogue of the fossils collected by the various parties in the field during the years 1868 to 1875, inclusive, pp. 88–107.

Descriptions of new species of Invertebrate fossils from strata of the Carboniferous, Jurassic, Cretaceous, and Tertiary Periods, pp. 107–135.

CARBONIFEROUS PERIOD.

Radiata.
Actinozoa. Page.
Amplexus, Sowerby 107
A. zaphrentiformis, n. s., White, 1876 107–108
Echinodermata.
Eupachycrinus, M. & W 108
E. platybasis, n. s., White, 1876 108
Archæocidaris, McCoy 109
A. cratis, n. s., White, 1876 109
Mollusca.
Gasteropoda.
Naticopsis, McCoy 109
N. remex, n. s., White, 1876 109

JURASSIC PERIOD.

Mollusca.
Conchifera.
Unio, Retzius 110
U. stewardi, n. s., White, 1876 110
Gasteropoda.
Neritina, Lamarck 110
N. ? powelli, n. s., White, 1876 110–111

CRETACEOUS PERIOD.

Mollusca.
Conchifera.
Ostrea, Linnæus 112
Subgenus *Alectryonia*, Fischer 112
O. (Alectryonia) sannionis, n. s., White, 1876 112
O. insecura, n. s., White, 1876 112–113
Plicatula, Lamarck 113
P. hydrotheca, n. s., White, 1876 113
Inoceramus, Sowerby 113
I. gilberti, n. s., White, 1876 113–114
I. howelli, n. s., White, 1876 114–115
Avicula, Klein 115
A. parkensis, n. s., White, 1876 115

	Page.
Area, Linnæus	115
A.? coalvillensis, n. s., White, 1876	115–116
Unio, Retzius	116
U. gonionotus, n. s., White, 1876	116–117
Cyrena, Lamarck	117
Subgenus *Veloritina*, Meek	117
C. (Veloritina) erecta, n. s., White, 1876	117
Turnus, Gabb	117
T. sphenoideus, n. s., White, 1876	117–118
Gasteropoda.	
Rhytophorus, Meek	118
R. meekii, n. s., White, 1876	118–119
Planorbis, Guettard	119
Subgenus *Bathyomphalus*, Agassiz	119
P. (Bathyomphalus) kanabensis, n. s., White, 1876	119
Physa, Draparnaud	119
P. kanabensis, n. s., White, 1876	119
Helix, Linnæus	120
H. kanabensis, n. s., White, 1876	120
Anchura, Conrad	120
A. ruida, n. s., White, 1876	120–121
A. prolabiata, n. s., White, 1876	121–122
Lunatia, Gray	122
L. utahensis, n. s., White, 1876	122
Goniobasis, Lea	122
G. cleburni, n. s., White, 1876	122–123
G. chrysaloidea, n. s., White, 1876	123
Viviparus, Montfort	123
V. panguit-chensis, n. s., White, 1876	123–124
Odontobasis, Meek	124
O. buccinoidea, n. s., White, 1876	124

TERTIARY PERIOD.

Mollusca.	
Conchifera.	
Unio, Retzius	125
U. patrinus, n. s., White, 1876	125
U. prophetious, n. s., White, 1876	125–126
U. brachyopisthus, n. s., White, 1876	126
U. shoshonensis, n. s., White, 1876	126–127
Corbicula, Mühlfeldt	127
C. powelli, n. s., White, 1876	127–128
Pisidium, Pfeiffer	128
P. saginatum, n. s., White, 1876	128
Mesodesma, Deshayes	128
M. bishopi, n. s., White, 1876	128
Corbula, Bruguière	129
C. subundifera, n. s., White, 1876	129
Gasteropoda.	
Succinea, Draparnaud	129
S. papillispira, n. s., White, 1876	129–130
Helix, Linnæus	130
H. riparia, n. s., White, 1876	130
H. peripheria, n. s., White, 1876	130
Pupa, Lamarck	130
P. incolata, n. s., White, 1876	130–131
P. arenula, n. s., White, 1876	131
Neritina, Lamarck	131
N. volvilineata, n. s., White, 1876	131
Melania, Lamarck	131
M. tarunda, n. s., White, 1876	131–132
Hydrobia, Hartmann	132
H. resta, n. s., White, 1876	132
H. utahensis, n. s., White, 1876	132–133
Viviparus, Montfort	133

Page.
V. plicapressus, n. s., White, 1876 133
Leioplax, Troschel 133
L.? turricula, n. s., White, 1876 133–134
Tulotoma, Haldeman 134
T. thompsoni, n. s., White, 1876 134
Phorus, Montfort 134
P. exoneratus, n. s., White, 1876 134–135

50.

WHITE, C. A. In Memoriam: Fielding Bradford Meek. <Am. Jour. Sci., 3d ser., vol. xiii, pp. 169–171. New Haven, 1877.

Same. New Haven, 1877. 8vo, 3 pages. One hundred separates printed with half-title and repaging.

A brief sketch of the life and labors of the paleontologist, Mr. Meek.

51.

WHITE, C. A Descriptions of new species of fossils from the Paleozoic rocks of Iowa. <Proc. Acad. Nat. Sci. Phila., for 1876, vol. xxviii, pp. 27–34. Philadelphia, 1877.

Same. Philadelphia, 1876. 8vo., pp. 27–34. Fifty separates printed without title-page, covers, or repaging.

Thirteen species are described as new, and the genus *Strobilocystites* is proposed.

Radiata.
Actinozoa.
Page.
Chaetetes, Fischer 27
C. muscatinensis, n. s., White, 1877 27
Monticulipora, d'Orbigny 27
M. monticula, n. s., White, 1877 27
Lophophyllum, E. & H., 1877 27
L. expansum, n. s., White, 1877 27–28
Echinodermata.
Strobilocystites, n. g., White, 1877 28
S. calvini, n. s., White, 1877 28–29
Megistocrinus, Owen 29
M. farnsworthi, n. s., White, 1877 29–30
Mollusca.
Brachiopoda.
Stricklandinia, Billings 30
S. castellana, n. s., White, 1877 30
Conchifera.
Paracyclas, Hall 31
P. sabini, n. s., White, 1877 31
Allorisma, King 31
A. marionensis, n. s., White, 1877 31–32
Gasteropoda.
Bellerophon, Montfort 32
B. bowmani, n. s., White, 1877 32
Euomphalus, Sowerby 32
E. springvalensis, n. s., White, 1877 32–33
Pteropoda.
Conularia, Miller 33
C. molaris, n. s., White, 1877 33
Cephalopoda.
Cyrtoceras, Goldfuss 33
C. dictyum, n. s., White, 1877 33–34
Articulata.
Vermes.
Tentaculites, Schlotheim 34
T. hoyti, n. s., White, 1877 34

52.

WHITE, C. A. Paleontological papers, No. 1: Descriptions of Unionidæ and Physidæ, collected by Prof. E. D. Cope, from the Judith River Group of Montana, during the summer of 1876. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iii, art. xx, pp. 599–602. Washington, 1877.

Same. Washington: Government Printing Office, 1877. 8vo, pp. 599–602. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers Nos. 2, 3, 4, and 5.

Six species are described as new. This is the first of a series of short unillustrated articles which reached eleven in number, and then ceased with the suspension of the survey in charge of Dr. Hayden. This form of title has not since been used by the author.

	Page.
Unionidæ.	
Unio primævus, n. s., White, 1877	599–600
Unio cryptorhynchus, n. s., White, 1877	600
Unio senectus, n. s., White, 1877	600–601
Anodonta propatoris, n. s., White, 1877	601
Physidæ.	
Bulinus atavus, n. s., White, 1877	601–602
Physa copei, n. s., White, 1877	602

53.

WHITE, C. A. Paleontological Papers No. 2: Descriptions of new species of Uniones, and a new genus of fresh-water Gasteropoda from the Tertiary strata of Wyoming and Utah. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iii, art. xxi, pp. 603–606. Washington, 1877.

Same. Washington: Government Printing Office, 1877. 8vo, pp. 603–606. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers Nos. 1, 3, 4, and 5.

Four species are described as new, two preoccupied names changed, and the genus *Cassiopella* proposed.

	Page.
Unionidæ.	
Unio proavitus, n. s., White, 1877	603–604
U. holmesianus, n. s., White, 1877	604
U. endlichi, n. s., White, 1877	604–605
U. cousi, [n. s.,] White, 1877	605
U. meeki, [n. s.,] White, 1877	605
U. mendax, n. s., White, 1877	605–606
Coriphastidæ.	
Cassiopella, n. g., White, 1877	606

54.

WHITE, C. A. Paleontological Papers No. 3: Catalogue of the Invertebrate Fossils, hitherto published from the fresh- and brackish-water deposits of the western portion of North America. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iii, art. xxii, pp. 607–614. Washington, 1877.

Same. Washington: Government Printing Office, 1877. 8vo, pp. 607–614. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers Nos. 1, 2, 4, and 5.

This paper contains a list of the fossil non-marine invertebrate forms at that time known. They have since been much increased. (See entry No. 115.)

The author has somewhat modified certain views expressed in this paper. Those later views are published in entry No. 115.

55.

WHITE, C. A. Paleontological Papers No. 4: Comparison of the North American Mesozoic and Cenozoic Unionidæ and associated mollusks with living species. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iii, art. xxiii, pp. 615–624. Washington, 1877.

Same. Washington: Government Printing Office, 1877. 8vo, pp. 615–624. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers Nos. 1, 2, 3, and 5.

The relations of the living Unionæ of the Mississippi River system with the fossil forms from western North America are pointed out.

56.

WHITE, C. A. Paleontological Papers No. 5: Remarks on the Paleontological characteristics of the Cenozoic and Mesozoic groups as developed in the Green River region. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iii, art. xxiv, pp. 625–629. Washington, 1877.

Same. Washington: Government Printing Office, 1877. 8vo, pp. 625–629. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers Nos. 1, 2, 3, and 4.

Same. Washington: Government Printing Office, 1878. 8vo, pp. 721–724. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers No. 6.

57.

WHITE, C. A. Circulation of the Blood, subjectively seen. <Am. Journ. of the Med. Sci., vol. lxxiii, n. s., p. 279. Philadelphia, 1877.

The appearance of multitudes of rapidly moving corpuscles to be observed when the eyes are shut, especially when there is more or less cerebral excitement, the author conceives to be due to the impact of the blood corpuscles behind the layer of rods and cones.

58.

WHITE, C. A. Paleontological Papers No. 6: Descriptions of new species of Invertebrate fossils from the Laramie Group. < Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. iv., art. xxviii, pp. 707–719. Washington, 1878.

Same. Washington: Government Printing Office, 1878. 8vo, pp. 707–719. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers No: 7.

Nineteen species of mollusks are described as new.

	Page.
Conchifera.	
Volsella, Scopoli	707
Subgenus *Brachydontes*, Swainson	707
V. (Brachydontes) regularis, n. s., White, 1877	707–708
V. (Brachydontes) laticostata, n. s., White, 1877	708
Nuculana, Link	708
N. inclara, n. s., White, 1877	708–709
Anodonta, Cuvier	709
A. parallela, n. s., White, 1877	709
Unio, Retzius	709
U. goniambonatus, n. s., White, 1877	709–710
U. aldrichi, n. s., White, 1877	710–711
Corbicula, Mergele	711
C. cleburni, n. s., White, 1877	711
C. cardiniæformis, n. s., White, 1877	711–712
C. obesa, n. s., White, 1877	712–713

	Page.
Subgenus *Leptesthes*, Meek	713
O. [Leptesthes) macropistha, n. s., White, 1877	713
Acella, Haldeman	714
A. haldemani, n. s., White, 1877	714
Physa, Draparnaud	714
P. felix, n. s., White, 1877	714
Helix, Linnæus	714
H. evanstonensis, n. s., White, 1877	714
Neritina, Lamarck	715
N. naticiformis, n. s., White, 1877	715
Subgenus *Velatella*, Meek	715
N. (Velatella) baptista, n. s., White, 1877	715–716
Goniobasis, Lea	716
G. endlichi, n. s., White, 1877	716
Viviparus, Lamarck	716
V. prudentia, n. s., White, 1877	716–717
V. cousi, n. s., White, 1877	717–718
Odontobasis, Meek	718
O. ? formosa, n. s., White, 1877	718–719

59.

WHITE, C. A. Paleontological Papers No. 7: On the distribution of Molluscan species in the Laramie Group. <Bulletin U. S. Geol. and Geog. Surv. of the Terr. vol. iv, art. xxix, pp. 721–724. Washington, 1878.

The unity of the Judith River, Fort Union, Lignitic, and Bitter Creek series, as the Laramie Group is shown in this paper.

60.

WHITE, C. A. Paleontological papers No. 8. Remarks upon the Laramie group. <Bulletin U. S. Geol. and Geogr. Surv. of the Terr., vol. iv, art. xxxvi, pp. 865–876. Washington, 1878.

Same. Washington: Government Printing Office, 1878. 8vo, pp. 865–876. Two hundred separates printed (author's edition), with title-page and paper covers, but without repaging.

The characteristics of the group and its probable geological age are discussed.

61.

WHITE, C. A., *and* NICHOLSON, H. A. Bibliography of North American Invertebrate Paleontology; being a report upon the publications that have hitherto been made upon the invertebrate paleontology of North America, including the West Indies and Greenland. By C. A. White, M. D., Paleontologist of the United States Geological Survey, and H. Alleyne Nicholson, M. D., D. Sc., Professor at the University of St. Andrews, Scotland. <Department of the Interior; United States Geological Survey of the Territories. Miscellaneous publications No. 10. Washington: Government Printing Office, 1878. 8vo, 132 pp.

CONTENTS.

Part I. Embracing titles and abstracts of publications made in the United States. By C. A. White, M. D. pp. 7–69.

Part II. Embracing titles and abstracts of publications made in British North America, in the West Indies, and Europe. By H. Alleyne Nicholson, M. D., D. Sc., pp. 71–132.

62.

WHITE, C. A. Change in the habits of Toads. <Nature. 4to, vol. xvii, p. 242. London and New York, 1878.

Observations made in Colorado along irrigating ditches show that the toads there have formed, or reverted to, the habit of diving to the bottom, when disturbed, and remaining there like frogs.

The structure of the eastern end of the Uinta Mountain range is shown, and the Park range of the Rocky Mountain system explained. The isolated up-th are described, and the term "partiversal," as applied to dips, is first used in th results of this work, as shown on the accompanying map, were subsequently sheets iv and xi of the Atlas of Colorado and Portions of the Adjacent Territo 1877 by the same survey.

65.

WHITE, C. A. Note on the Garter Snake. <Amer. Naturalist, vol. xii, delphia, 1878.

This note records a supposed instance of the swallowing of a quantity of snake immediately before diving to the bottom of a pool of water.

66.

WHITE, C. A. Contributions to Invertebrate Paleontology, No. 1: Creta of the Western States and Territories. <Eleventh Annual Repor and Geogr. Surv. of the Terr. (for the year 1877), pp. 273–319, pls. ington, 1879.

Same. Washington: Government Printing Office, 1879. 8vo, pp. 273- Two hundred separates printed without repaging, but with title-pa covers. The title upon the title-page differs from that which head the omission of the word "Invertebrate."

Fifty-six species are described and figured, a part of which are new, but mo been previously described by different authors, without illustrations. This se butions" was established for the purpose of illustrating species of fossils previ as well as new forms. They number eight in all, and that form of title has quently used by the author in connection with his work for the United States

Radiata.

Actinaria.

Caryophyllia, Lamarck.

C. johannis, n. s., White, 1879, pl. vi, figs. 6 *a*, *b*.....

C. egeria, n. s., White, 1879, pl. vi, figs. 7 *a*, *b*.....

Mollusca.

	Page.
P. (*Oxytoma ?*) *gastrodes*, Meek, 1873, pl. x, fig. 1 *a*	280–281
Subgenus *Pseudoptera*, Meek	281
P. (*Pseudoptera*) *propleura*, Meek, 1873, pl. x, figs. 2 *a–c*	281–284
Inoceramus, Sowerby	284
I. howelli, White, 1876, pl. iv, figs. 1 *a–c*	284–285
I. gilberti, White, 1876, pl. iii, figs. 1 *a–c*	285
I. oblongus, Meek, 1871, pl. ii, figs. 1 *a*, *b*	285–286
Barbatia, Gray	286
B. coalvillensis, White, 1876, pl. vi, figs. 2 *a*, *b*	286–287
Crassatella, Lamarck	287
C. cimarronensis, n. s., White, 1879, pl. v, figs. 3 *a–c*	287–288
Taneredia, Lycett	288
T. ? *cælionotus*, n. s., White, 1879, pl. v, figs. 2 *a–d*	288
Cyrena, Lamarck	289
C. securis, Meek, 1873, pl. iii, figs. 2 *a–c*	289
C. inflexa, Meek, 1871, pl. x, figs. 7 *a*, *b*	290
Corbula, Bruguière	290
C. nematophora, Meek, 1873, pl. iii, figs. 4 *a–d*	290–291
Cardium, Linnæus	291
C. pauperculum, Meek, 1872, pl. ix, fig. 3 *a*	291
C. *trite*, n. s., White, 1879, pl. v, figs. 4 *a*, *b*	291–292
Cardium —— *?*, White, 1879, pl. ix, figs. 2 *a–c*	292
Trapezium truncatum. Meek, 1871, pl. x, figs. 6 *a*, *b*	292–293
Trapezium ? *micronema*, Meek, 1873, pl. x, figs. 5 *a*	293
Baroda wyomingensis, Meek, 1871, pl. x, figs. 3 *a*, *b*	293–294
Baroda subelliptica, n. s., White, 1879, pl. x, figs. 4 *a–d*	294–295
Mactra ? *holmesi*, Meek, 1875, pl. vi, figs. 4 *a–c*	295–297
Mactra ? *cañonensis*, Meek, 1871, pl. ix, figs. 11 *a–c*	297–298
Pachymya, Sowerby	298
P. austinensis, Shumard, pl. viii, figs. 1 *a*, *b*, and pl. v, figs. 7 *a*, *b*	298
P. ? *herseyi*, n. s., White, 1879, pl. v, figs. 5 *a*, *b*	298–299
Glycimeris, Lamarck	299
G. berthoudi, n. s., White, 1879, pl. vi, figs. 1 *a*, *b*	299–300
Parapholas, Conrad	300
P. sphenoideus, White, 1876, pl, v, figs. 1 *a–d*	300–302
Gasteropoda.	
Paliurus, Gabb	302
P. pentangulatus, n. s., White, 1879, pl. iv, figs. 4 *a*, *b*	302–303
Anisomyon, M. & H	303
A. centrale, Meek, 1872, pl. ix, figs. 1 *a–d*	303–304
Actæon, Montfort	304
A. woosteri, n. s., White, 1879, pl. vii, figs. 9 *a–c*	304
Actæonina, d'Orbigny	305
A. prosocheila, n. s., White, 1879, pl. vii, figs. 10 *a*, *b*	305
Turbonilla, Risso	305
T. (*Chemnitzia*) *coalvillensis*, Meek, 1873, pl. ix, figs. 5 *a*, *b*	305–306
Physa, Draparnaud	306
P. carlstoni, Meek, 1873, pl. vii, fig. 12 *a*	306–307
Physa —— *?*, White, 1879, pl. vii, fig. 13 *a*	307–308
Neritina, Lamarck	308
N. pisum, Meek, 1873, pl. vii, figs. 11 *a–c*	308
N. incompta, White, 1876, pl. vii, figs. 6 *a–c*	308–309
N. (*Velatella*) *patelliformis*, Meek, 1873, pl. vii, figs. 7 *a–d*	309
N. (*Velatella*) *patelliformis* var. *weberensis*, White, 1879, pl. vii, figs. 8 *a* and *b*	309–310
Euspira, Agassiz	310
E. coalvillensis, White, 1876, pl. iv. figs. 2 *a* and *b*	310
Anchura, Conrad	311
A. haydeni, n. s., White, 1879, pl. vii, fig. 1 *a*	311–312
A. (*Drepanocheilus*) *ruida*, White, 1876, pl. vii, figs. 4 *a*, *b*	312
A. (*Drepanocheilus*) *mudgeana*, n. s., White, 1879, pl. vii, figs. 3 *a*, *b*	312–313
A. (*Drepanocheilus*) *prolabiata*, White, 1876, pl. vii, fig. 2 *a*	313–314
Turritella, Lamarck	314
T. marnochi, n. s., White, 1879, pl. vii, figs. 5 *a*, *b*	314–315
T. coalvillensis, Meek, 1873, pl. ix, fig. 4 *a*	315–316
T. (*Aclis ?*) *micronema*, Meek, 1873, pl. ix, fig. 8 *a*	316

Bulimella, Forbes
B. ? funicula, Meek, 1873, pl. ix, fig. 10 *a*
Fusus, Lamark
F. (Neptunea?) gabbi, Meek, 1873, pl. ix, fig. 9 *a*
Admetopsis, Meek
A. rhomboides, Meek, 1873, pl. ix, figs. 6 *a*, *b*
A. subfusiformis, Meek, 1873, pl. ix, fig. 7 *a*

67.

WHITE, C. A. Descriptions of new species of Invertebrate fossils from the Carb ferous and Upper Silurian rocks of Illinois and Indiana. <Proc. Acad. Nat. Phila., vol. xxx, pp. 29–37. Philadelphia, 1878.

Same. 8vo., pp. 29–37. Philadelphia, 1878. Thirty separates printed without t page, covers, or repaging.

Nine species are described as new.

Radiata.
Actinozoa.
Baryphyllum, Edwards & Haime
B. fungulus, n. s., White, 1878
Echinodermata.
Platycrinus, Miller
P. bonoensis, n. s., White, 1878
Scaphiocrinus, Hall
S. gibsoni, n. s., White, 1878
S. gurleyi, n. s., White, 1878
Lepidesthes, M. & W.
L. colletti, n. s., White, 1878
Mollusca.
Polyzoa.
Ptilodyctia, Lonsdale
P. triangulata, n. s., White, 1878
Conchifera.
Astartella, Hall
A. gurleyi, n. s., White, 1878
Cephalopoda.
Nautilus, Breynius
N. danvillensis, n. s., White, 1878
Articulata.
Vermes.
Serpula, Linnæus
S. insita, n. s., White, 1878

68.

WHITE, C. A. Anecdote of the Great Horned Owl. <American Naturalist, vol. p. 783. Philadelphia, 1879.

This anecdote is told to illustrate the precision, rapidity, and extent of the action of muscles of the neck of that owl. Its authorship is indicated only by the initials "C. A. W

69.

WHITE, C. A. Remarks on the Jura-Trias of Western North America. <Am. J Sci., vol. xvii, 3d ser., pp. 214–218. New Haven, 1879.

Same. New Haven, 1879. 8vo., pp. 214–218. Twenty separates printed without t page, covers, or repaging.

Reference is made in this article to the Triassic fossils which are described in Paleontol cal Papers No. 9.

70.

WHITE, C. A. Report on the Paleontological Field-work for the season of 18 <Eleventh Annual Report U. S. Geol. and Geog. Surv. of the Terr. (for the y 1877), pp. 161–272. Washington, 1879.

same. Washington: Government Printing Office, 1879. 8vo, pp. 161–272. Two hundred separates printed, with title-page and paper covers, but without repaging.

This report gives results of observations in Colorado, Utah, and Wyoming. The existence of the Green River and Bridger groups south of the Uinta Mountains is first announced in this report; and descriptions of three species of fossils are given in foot-notes.

	Page.
Bulinus disjunctus, n. s., White, 1879	170
Pinna laksei, n. s., White, 1879	181
Corbula dubiosa, n. s., White, 1879	249
Crow Creek section	164
List of fossils from the valley of Crow Creek, Colorado	165
Notes on the Laramie fossils obtained in the valley of Crow Creek, Colorado	165–175
List of the fossils collected from Cretaceous strata in the valley of the Cache à la Poudre, from five to twelve miles west of Greeley, Colo	175–176
List of Cretaceous fossils collected at Fossil Ridge, three miles southeastward from Spring cañon, and about six miles south of Fort Collins, Colorado	176–177
List of fossils collected in the valley of Little Thompson Creek	177–178
List of the fossils collected at the mouth of Saint Vrains River, Colorado	178–179
Notes on the fossils of the Fox Hills group as developed in Colorado, east of the Rocky Mountains	179–189
Bijou Creek section	189
List of fossils from the valley of Bijou Creek, Colorado	190
Notes on the Laramie fossils collected in the valley of Bijou Creek, Colorado	190–197
List of Cretaceous fossils from the vicinity of Golden City and Morrison, Colo	197
Notes on the fossils from the vicinity of Golden City and Morrison	179–204
List of Cretaceous fossils collected on Sage Creek, an upper tributary of Yampa River, Colorado	205
Notes on the Cretaceous fossils of Sage Creek	205–207
List of Laramie fossils collected in Yampa valley, near Cañon Park, Northwestern Colorado	207
Notes on the Laramie fossils of Yampa valley	208–211
List of the Laramie fossils found in the Danforth Hills, Northwestern Colorado	211
Notes on the Laramie fossils of Danforth Hills	211–215
List of Laramie fossils collected at Rock Springs, Wyoming	215
List of Laramie fossils from Bitter Creek valley, two miles west of Point of Rocks station, Wyoming	215–216
List of the Laramie fossils collected at Point of Rocks Station, Wyoming	216
List of the Laramie fossils collected at Black Buttes Station, Wyoming	216–217
Notes on the Laramie fossils of Bitter Creek valley	217–222
Section of Laramie strata at Black Butte Station	222
List of Cretaceous fossils from a cañon six miles northwest from White River Indian Agency, Northwestern Colorado	224
Notes on the Cretaceous fossils from near White River Indian Agency	224–226
List of fossils of the Wasatch group collected in White River valley, Colorado	226
Notes on the Wasatch fossils of White River valley	226–229
List of Cretaceous fossils at Dodd's Ranch on Ashley's Fork, Utah	229
Notes on the Cretaceous fossils from Ashley's Fork	230–232
List of fossils from the Cretaceous series at Coalville, Utah	232–233
Notes on the Cretaceous fossils of Coalville, Utah	233–241
List of Laramie fossils from Bear River valley, Wyoming	241–242
Notes on Laramie fossils of Bear River valley, Wyoming	242–248
List of Cretaceous fossils from the valley of Bear River, Wyoming	248
Notes on the Cretaceous fossils of Bear River valley	248–249
List of Cretaceous fossils collected at Hilliard Station, Wyoming	249
Notes on the Cretaceous fossils of Hilliard Station	249–251
General discussion	251–255
Table showing the geographical distribution of the Cretaceous species collected during the season of 1877	252–253
Fox Hills Group	252–253
Colorado Group	253
Table showing the geographical distribution of the fossils of the Laramie Group, collected during the season of 1877	255
Catalogue of fossils	265

Page.
List of Cretaceous fossils sent by Mr. Arthur Lakes from Bear Creek valley, near Morrison, Colorado 265–266
List of fossils sent by Mr. L. C. Wooster from the vicinity of Greeley, Colo 266
List of Cretaceous fossils sent by Mr. J. C. Hersey from Colorado 266–267
List of Cretaceous fossils sent by Capt. E. L. Berthond from Colorado 267–268
List of Cretaceous fossils sent by Prof. B. F. Mudge from Dennison, Tex 268
List of Cretaceous fossils sent by Mr. G. W. Marnoch from Helotes, Bexar County, Texas 268–269
List of Cretaceous fossils sent by D. H. Walker to the Smithsonian Institution from near Salado, Bell County, Texas 269–270
Concluding remarks 270–271

71.

WHITE, C. A. Paleontological Papers No. 9: Fossils of the Jura-Trias of Southeastern Idaho. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. v, art. v, pp. 105–117. Washington, 1879.

Same. Washington: Government Printing Office, 1879. 8vo, pp. 105–117. Two hundred separates printed (author's edition) without repaging, but with title-page, and in paper covers, together with Paleontological Papers No. 10.

Ten species are described, most of which are new; and the genus *Meekoceras*, Hyatt, is described for the first time in this article.

Page.
Brachiopoda.
Terebratula, Llhwyd 106
T. semisinplex, n. s., White, 1879 106
T. augusta, Hall & Whitfield 106–10
Conchifera.
Aviculopecten, McCoy 10
A. pealei, n. s., White, 1879 109–11
A. altus, n. s., White, 1879 1
A. idahoensis, Meek 110–1
Cephalopoda.
Meekoceras, n. g., Hyatt, 1879 111–1
M. aplanatum, n. s., White, 1879 112–1
M. mushbachanus, n. s., White, 1879 113–1
M. gracilitatis, n. s., White, 1879 114–1
M. gracilitatis var., White, 1879 1
Arcestes, Suess 1
A.? cirratus, n. s., White, 1879 116–1
Arcestes? ——? White, 1879 1
Arcestes? ——? White, 1879 1

72.

WHITE, C. A. Paleontological Papers No. 10. Conditions of Preservation of Invertebrate Fossils. <Bulletin U. S. Geol. and Geog. Surv. of the Terr. Vol. v, art. viii, pp. 133–141. Washington, 1879.

Same. Washington: Government Printing Office, 1879. 8vo., pp. 133–141. Two hundred separates printed (author's edition) without repaging, but with title page and with paper covers, together with Paleontological Papers No. 9.

The fact is pointed out that shells of different classes and families which have been fossilized under the same conditions are differently preserved.

73.

WHITE, C. A. Paleontological Papers No. 11. Remarks upon Certain Carboniferous Fossils from Colorado, Arizona, Idaho, Utah, and Wyoming, and Certain Cretaceous Corals from Colorado, together with Descriptions of New Forms. <Bulletin U. S. Geol. and Geog. Surv. of the Terr. Vol. v, art. xiv, pp. 209–221. Washington, 1879.

Same. Washington: Government Printing Office, 1879. 8vo., pp. 209–221. Two hundred separates printed (author's edition) without repaging, but with title-page and paper covers. The series of Paleontological Papers closes with this number.

Thirteen species are described, most of which are new. Attention is called to the commingling of Upper and Lower Carboniferous types in the Carboniferous strata of the western portion of North America.

CARBONIFEROUS.

	Page.
Actinozoa.	
Leptopora, Winchell	211
L. winchelli, n. s., White, 1879	211–212
Echinodermata.	
Granatocrinus, Troost	212
G. lotoblastus, White ? 1879	212–213
Polyzoa.	
Archimedes, Lesueur	213
Archimedes, —— ?, White, 1879	213–214
Ptilodyctia, Lonsdale	214
P. triangulata, White, 1879	214–215
Brachiopoda.	
Retzia, King	215
R. woosteri, n. s., White, 1879	215–216
Conchifera.	
Nuculana, Link	217
N. obesa, n. s., White, 1879	216–216
Nucula, Lamarck	217
N. perumbonata, n. s., White, 1879	217
Allorisma, King	217
A. ? gilberti, n. s., White, 1879	217–218
Gasteropoda.	
Bellerophon, Monfort	218
B. subpapillosus, White, 1879	218–219
Murchisonia, D'Archiac	219
M. terebra, n. s., White, 1879	219
Pleurotomaria, Defrance	219
P. grayvillensis, Norwood & Pratten	219–220

CRETACEOUS FORMS.

Actinozoa.	
Chastetes, Fischer	220
C. ? ? dimissus, n. s., White, 1879	220–221
Beaumontia, Edwards & Haime	221
B. ? solitaria, n. s., White, 1879	221

74.

White, C. A., and **Nicholson**, H. A. Supplement to the Bibliography of North American Invertebrate Paleontology. <Bulletin U. S. Geol. and Geog. Surv. of the Terr., vol. v, pp. 143–152. Washington, 1879.

Same. Washington: Government Printing Office, 1879, pp. 143–152. Two hundred separates printed (author's edition) with title-page and paper covers, but without repaging.

This supplement embraces works which were published after the publication of the Bibliography, besides some that were inadvertently omitted then.

Part I. Publications made in the United States. By C. A. White, pp. 143–149.

Part II. Publications made in British North America, the West Indies, and Europe. By H. Alleyne Nicholson, pp. 150–152.

75.

White, C. A. Paleontology: Fossils of the Indiana Rocks. <State of Indiana. Second Annual Report of the Department of Statistics and Geology, 471–522, pls. i–xi. Indianapolis, 1880.

Same. In Indiana Geological Report, 1879–'80. From the Second Annual Repo the Bureau of Statistics and Geology. John Collett, Chief of Department. dianapolis, 1881. 8vo. pp. 103–154, and 11 plates.

This book is an extract of the geological and biological matter from the volume of th ceding entry, repaged and bound in cloth, with new title-page as above.

This work is designed for popular use, and, with the exception of one variety, none c species described and figured are new. The illustrations are also largely copies of for published figures. Forty-nine species of characteristic Silurian, Devonian, and Carbonif forms are given.

LOWER SILURIAN.

Mollusca.]

Brachiopoda.

Strophomena, Rafinesque .....

S. alternata, Conrad, pl. i, figs. 6 and 7..... 48

S. planumbona, Hall, pl. ii, figs. 13 and 14..... 48

Orthis, Dalman.....

O. subquadrata, Hall, pl. i, figs. 3–5..... 48

O. occidentalis, Hall, pl. ii, figs. 10–12..... 48

O. biforata, Schlotheim var. *acutilirata*, Conrad, pl. ii, figs. 5–9..... 48

Rhynchonella, Fischer.....

R. capax, Conrad, pl. i, figs. 9–11..... 48

R. dentata, Hall, pl. i, figs. 12–14..... 49

Lamellibranchiata.

Megaptera, M. & W .....

Ambonychia (*Megaptera*) *casei*, M. & W., pl. i, figs. 1 and 2..... 49

Gasteropoda.

Cyclonema, Hall.....

C. bilix, Conrad, pl. ii, figs. 3 and 4 49

Crustacea.

Trilobites.

Calymene, Brongniart .....

C. senaria, Conrad, pl. ii, figs. 1 and 2..... 49

UPPER SILURIAN.

Echinodermata.

Eucalyptocrinus, Goldfuss .....

E. crassus, Hall, pl. iii, fig. 1 49

Brachiopoda.

Rhynchonella, Fischer.....

R. tennesseensis, Roemer, pl. iii, figs. 2–4 49

Spirifer, Sowerby .....

S. radiata, Sowerby, pl. iii, figs. 5 and 6 .....

Gasteropoda.

Platyostoma, Conrad .....

P. niagarense, Hall, pl. iii, figs. 7 and 8..... 49

Crustacea.

Trilobites.

Cyphaspis, Burmeister .....

C. christyi, Hall, pl. iii, fig. 9 49

DEVONIAN.

Polypi.

Zaphrentis, Rafinesque & Clifford .....

Zaphrentis —— ? White, 1880, pl. v, figs. 3 and 4.....

Favosites, Lamarck .....

Favosites —— ? White, 1880, pl. v, figs. 1 and 2 .....

Brachiopoda.

Strophodonta, Hall .....

S. demissa, Conrad, pl. iv, figs. 6 and 7 500

Orthis, Dalman.....

O. iowensis, Hall (?), pl. v, figs. 10–12 501

Atrypa, Dalman .....

A. reticularis, Linnæus, pl. v, figs. 7–9.....

Athyris, McCoy .....

A. vittata, Hall, pl. iv, figs. 8 and 9 502

Spirifer, Sowerby .....

Page.
S. acuminata, Conrad, pl. iv, figs. 1–3 503–504
S. curitines, Owen, pl. iv, figs. 4 and 5 504
S. gregaria, Clapp, pl. iv, figs. 10 and 11 504–505
Lamellibranchiata.
Paracyclas, Hall 505
P. elliptica var. *occidentalis*, Hall, pl. v, figs. 5 and 6 505

SUB-CARBONIFEROUS.

Polypi.
Lithostrotion, Fleming.
L. mamillare, Castelnau, pl. vi, figs. 1 and 2 506
(*L. canadense*, Castelnau), pl. vi, figs. 1 and 2 506
Echinodermata.
Taxocrinus, Phillips 506
T. multibrachiatus, Lyon & Cassady var. *collatti*, White, 1880, pl. vii, fig. 3 506–507
Scaphiocrinus, Hall 507
S. gibsoni, White, 1878, pl. vii, fig. 7 507–508
S. gurleyi, White, 1878, pl. vii, fig. 8 509
Actinocrinus, Miller 510
A. wachsmuthi, White, 1878, pl. vii, fig. 6 510
Pentremites, Say 511
P. pyriformis, Say, pl. vii, fig. 9 511
P. godoni, Defrance, pl. vii, figs. 10 and 11 511
P. conoideus, Hall, pl. vii, fig. 12 512
Brachiopoda.
Spirifer, Sowerby 512
S. textus, Hall, pl. vii, figs. 1 and 2 512–513
Pteropoda.
Conularia, Miller 513
C. missouriensis, Swallow? pl. vi, fig. 4 513
Gasteropoda.
Platyceras, Conrad 514
P. equilatera, Hall, pl. vii, fig. 5 514
Cephalopoda.
Goniatites, De Haan 514
G. oweni, Hall, pl. vii, figs. 3 and 4 515
Crustacea.
Trilobites.
Phillipsia, Portlock 515
P. bufo, M. & W., pl. vi, fig. 5 515–516

COAL MEASURES.

Brachiopoda.
Productus, Sowerby 516
P. costatus, Sowerby, pl. viii, figs. 7 and 8 516–517
Spirifer, Sowerby 517
S. cameratus, Morton, pl. viii, fig. 3 517–518
Lamellibranchiata.
Allorisma, King 518
A. subcuneata, M. & H.? pl. viii, figs. 1 and 2 518–519
Gasteropoda.
Polyphemopsis, Portlock 519
P. fusiformis, Hall, pl. viii, fig. 6 519
Pleurotomaria, Defrance 519
P. tabulata, Hall, pl. viii, figs. 4 and 5 519–520

FOSSIL PLANTS.

Neuropteris 520
N. hirsuta, Lesqx. pl. ix, figs. 1–3 520
N. rarinervis, Bunbury, pl. x, figs. 1–3 520–521
Callipteris 521
C. sullivanti, Lesqx. pl. ix, fig. 4 521
Annularia 521
A. longifolia, Brongniart? pl. xi, figs. 1 and 2 521–522
Odontopteris 522
O. subcuneata, Bunbury? pl. xi, fig. 3 522
Sphenopteris 522
S. acuta, Brongniart? pl. xi, fig. 4 522

76.

WHITE, C. A. Progress of Invertebrate Paleontology in the United [illegible] year 1879. /Amer. Nat. vol. xiv. pp. 250–260. Philadelphia, Feb. [illegible]

Philadelphia, 1880, 8vo, pp. 250–260. One hundred separates [illegible] title-page, covers, or repaging.

The article like those for the years 1878, 1881, and 1882, respectively, [illegible] of the works published within the year designated, together with [illegible]

77.

WHITE, C. A. On the Antiquity of Certain Invertebrate Types of [illegible] United States. /Amer. Jour. Sci., 3d ser., vol. [illegible] pp. 44–49. [illegible] name. New Haven, 1880, 8vo, pp. 44–49. Twenty separates printed [illegible] page, covers, or repaging.

It is shown that not only were many of the genera of living North [illegible] established as early as the close of the Cretaceous period, and many of the [illegible] established thus early also.

78.

WHITE, C. A. Descriptions of new species of Carboniferous Invertebrata. /Proc. U. S. Nat. Mus., vol. ii, pp. 252–290. [illegible] name. Washington, 1880. Washington: Government Printing Office. 1879. 8vo, pp. 252–[illegible] One hundred and fifty separates printed without title-page, covers [illegible]

Six species of Echinoderms are described, and the genus Lecanocrinus is [illegible]

Lithostrota.

Acervularia Schweiggeri [illegible]

A. adjunctata, n. s., White, 1879, plate i, figs. 1–3 [illegible]

Echinodermata.

Lecanocrinus, n. g., White, 1879 [illegible]

L. allendaformis, n. s., White, 1879, pl. i, figs. 4 and 5 [illegible]

Botryocrinus, M. & W [illegible]

B. planus, n. s., White, 1879, pl. i, figs. 6 and 7 [illegible]

Cyathocrinus, Miller [illegible]

C. stellatus, n. s., White, 1879, pl. i, figs. 9 and 10 [illegible]

Rhodocrinus, Miller [illegible]

R. superstes, n. s., White, 1879, pl. i, figs. 11 and 12 [illegible]

Archæocidaris, McCoy [illegible]

[redacted]

81.

WHITE, C. A. Descriptions of new Cretaceous Invertebrate Fossils from Kansas and Texas. <Proc. U. S. Nat. Mus., vol. ii, pp. 292–298, pls. i–v. Washington, 1880.

Same. Washington: Government Printing Office, 1879, 8vo, pp. 292–298, and five plates. One hundred and fifty separates printed, together with the papers of the two preceding entries, without title-page, covers, or repaging.

Six species are described as new and illustrated.

	Page.
Mollusca.	
Ostrea, Linnæus	293
Subgenus *Alectryonia*, Fischer	293
O. (Alectryonia) blackii, n. s., White, 1879, pl. iv, figs. 1 and 2	293
Exogyra, Say	293
E. forniculata, n. s., White, 1879, pl. iv, figs. 3 and 4	293–294
E. winchelli, n. s., White, 1879, pl. ii, figs. 1 and 2, and pl. iii, figs. 1 and 2	294–295
Gervillia, Defrance	295
G. mudgeana, n. s., White, 1879, pl. v, figs. 3 and 4	295–296
Pteria, Scopoli	296
Subgenus *Ozytoma*, Meek	296
P. (Ozytoma) salinensis, n. s., White, 1879, pl. v, figs. 1 and 2	296–297
Pachymya, Sowerby	297
P.? compacta, n. s., White, 1879, pl. vi, figs. 3 and 4	297
Thracia, Leach	297
T. myæformis, n. s., White, 1879, pl. vi, figs. 1 and 2	297–298

82.

WHITE, C. A. Report on the Carboniferous Invertebrate Fossils of New Mexico. <Report upon U. S. Geog. and Geol. Surveys West of the 100th Meridian; in charge of Capt. George M. Wheeler, Corps of Engineers, U. S. Army. 4to., vol. iii; Supplement. Geology. Appendix, pp. I–XXXVIII, pl. i–ii. Washington, 1881.

Same. Washington: Government Printing Office, 1881, 4to, pp. I–XXXVIII, and two plates. Seventy-five separates printed, without title-page, covers, or repaging.

This report embraces an annotated catalogue of the species collected at each locality, and also descriptions of seventeen species, a part of which are new.

DESCRIPTIONS OF SPECIES.

Echinodermata.

Archæocidaris, McCoy XXII

A. triplex, n. s., White, 1881, pl. iv, figs. 3 *a–c* ..... XXII–XXIII

Brachiopoda.

Orthis, Dalman XXIII

O. resupinoides, Cox? 1857, pl. iii, figs. 2 *a*, *b* ..... XXIII–XXIV

Polyzoa.

Ptilodyctia, Lonsdale XXIV

P. triangulata, White, 1878, pl. iv, figs. 2 *a–e* ..... XXIV–XXV

Conchifera.

Myalina, de Koninck XXV

M. permiana, Swallow, 1[8]58, pl. iii, figs. 1 *a–d* ..... XXV–XXVII

Pleurophorus, King XXVII

P. subcostatus, M. & W., 1866, pl. iii, fig. 8 *a* XXVII

Pteropoda.

Conularia, Miller XXVIII

C. crustula, White, 1880, pl. iii, figs. 4 *a*, *b* XXVIII

Gasteropoda.

Soleniscus, M. & W XXVIII

S. brevis, n. s., White, 1881, pl. iv, figs. 5 *a–c* ..... XXVIII–XXIX

S. planus, n. s., White, 1881, pl. iv, figs. 4 *a–c* ..... XXIX–XXX

Bellerophon, Montfort XXX

B. inspeciosus, n. s., White, 1881, pl. iv, figs. 1 *a–d* ..... XXX–XXXI

Pleurotomaria, Defrance XXXI

P. perizonata, n. s., White, 1881, pl. iii, figs. 5 *a–c* XXXI

Murchisonia, d'Archiac XXXI

M. copei, n. s., White, 1881, pl. iii, figs. 10 *a*, *b* ..... XXXI–XXXII

Page.
Rotella, Lamarck xxxi
R. verruculifera, n. s., White, 1881, pl. iv, figs. 7 *a–d* ..... xxxii–xxxiii
Naticopsis, McCoy xxxiii
N. wheeleri, Swallow, var. White, 1881, pl. iv, figs. 6 *a, b* ..... xxxiii–xxxiv
N. monilifera, White, 1880, pl. iii, figs. 3 *a–d* ..... xxxiv–xxxv
N. altonensis, McChesney, pl. iii, fig. 6*a* xxxv
Loxonema, Phillips xxxv
L. rugosa, M. & W., pl. iii, fig. 7 *a* xxxv
Aclis, Loven xxxv
A.? stevensoni, n. s., White, 1881, pl. iii, figs. 9 *a, b* ..... xxxv–xxxvi

83.

WHITE, C. A. Progress of Invertebrate Paleontology in the United States for the year 1880. <Amer. Nat., vol. xvi, pp. 273–279. Philadelphia, 1881.

Same. Philadelphia, 1881, 8vo, pp. 273–279. One hundred separates printed without title-page, covers, or repaging.

This article is similar to that of entry No. 74.

84.

WHITE, C. A. English Sparrows refusing to eat worms. <Amer. Nat., vol. xv, pp. 671–672. Philadelphia, 1881.

It is observed that the sparrows refused to eat earth worms, which are favorite food with other birds, when they come to the surface after rains.

85.

WHITE, C. A. Note on the occurrence of Productus giganteus in California. <Proc. U. S. Nat. Mus., vol. iii, pp. 46–47, pl. i. Washington, 1881.

Same. Washington: Government Printing Office, 1880. 8vo, pp. 46–47, and one plate. One hundred and fifty separates printed, together with the papers of the two following entries, without title-page, covers, or repaging.

The volume was first distributed without the plate; but the latter was afterward printed and distributed.

86.

WHITE, C. A. Note on Acrothele. <Proc. U. S. Nat. Mus., vol. iii, p. 47. Washington, 1881.

Same. Washington: Government Printing Office, 1880, 8vo, p. 47. One hundred and fifty separates printed, together with the last, and the next following entry.

It is shown that *Acrotreta subsidua*, White, from Southern Utah, really belongs to the genus *Acrothele*, Linnarsson.

87.

WHITE, C. A. Description of a new Cretaceous Pinna from New Mexico. <Proc. U. S. Nat. Mus., vol. iii, pp. 47–48. Washington, 1881.

Same. Washington: Government Printing Office, 1880, 8vo, pp. 47–48. One hundred and fifty separates printed, together with the papers of the two preceding entries, without title page, covers, or repaging.

The author now thinks that the proposed new species (*Pinna stevensoni*) is only a variety of *P. petrina*, White.

Page.
Pinna stevensoni, n. s., White, 1880 47–48

88.

WHITE, C. A. Note on the occurrence of Stricklandinia salteri and S. davidsoni in Georgia. <Proc. U. S. Nat. Mus., vol. iii, pp. 48–49. Washington, 1881.

Same. Washington: Government Printing Office, 1880, 8vo, pp. 48–49. One hundred and fifty separates printed without title-page, covers, or repaging.

89.

WHITE, C. A. Description of a very large fossil Gasteropod from the State of Puebla, Mexico. <Proc. U. S. Nat. Mus., vol. iii, pp. 140–142, and one plate. Washington, 1881.

Same. Washington: Government Printing Office, 1880, 8vo, pp. 140–142, and one plate. One hundred and fifty separates printed without title-page, covers, or repaging.

The species described is from strata believed to be of Cretaceous age.

	Page.
Tylostoma, Sharpe	141
T. princeps, n. s., White, 1880, pl. ii, figs. 1 and 2	141–142

90.

WHITE, C. A. Descriptions of new Invertebrate fossils from the Mesozoic and Cenozoic rocks of Arkansas, Wyoming, Colorado, and Utah. <Proc. U. S. Nat. Mus., vol. iii, pp. 157–162. Washington, 1881.

Same. Washington: Government Printing Office, 1880, 8vo, pp. 157–162. One hundred and fifty separates printed without title-page, covers, or repaging.

Nine species are described as new; but none are illustrated.

	Page.
Mollusca.	
Conchifera.	
Pteria, Scopoli	157
Subgenus *Oxytoma*, Meek	157
P. (Oxytoma) erecta, n. s., White, 1880	157–158
Solemya, Lamarck	158
S. bilix, n. s., White, 1880	158
Lucina, Bruguière	158
L. profunda, n. s., White, 1880	158–159
Gasteropoda.	
Planorbis, Guettard	159
P. æqualis, n. s., White, 1880	159
Subgenus *Gyraulus*, Agassiz	159
Planorbis (Gyraulus) militaris, n. s., White, 1880	159–160
Limnæa, Lamarck	160
Subgenus *Leptolimnea*, Swainson	160
Limnæa (Leptolimnea) minuscula, n. s., White, 1880	160
Helix, Linnæus	160
Subgenus *Patula*, Haldeman	160
H. (Patula) sepulta, n. s., White, 1880	160
Articulata.	
Vermes.	
Spirorbis, Lamarck	161
S.? dickhauti, n. s., White, 1880	161
Crustacea.	
Callianassa, Leach	161
C. ulrichi, n. s., White, 1880	161–162

91.

WHITE, C. A. [Review of] A. G. Wetherby: Description of new fossils from the Lower Silurian and Subcarboniferous rocks of Ohio and Kentucky. (Journ. Cincinnati Soc. Nat. History, vol. iv, no. 1 [April, 1881], pp. 77–85, pl. ii.) <Neues Jahrbuch für Mineralogie, Geologie, und Palæontologie, ii Band, p. 408. Stuttgart, 1881.

92.

WHITE, C. A. [Review of] A. G. Wetherby: Description of new fossils from the Lower Silurian and Subcarboniferous rocks of Kentucky. (Journ. Cincinnati Soc. Nat. History, vol. iv, no. 2 [July, 1881], pp. 177–179, pl. v.) <Neues Jahrbuch für Mineralogie, Geologie, und Palæontologie, ii Band, p. 408. Stuttgart, 1881.

93.

WHITE, C. A. [Review of] S. A. Miller: New species of fossils and remarks upon others from the Niagara Group of Illinois. (Journ. Cincinnati Soc. Nat. History, vol. iv, no. 2 [July, 1881], pp. 166–176, pl. iv.) <Neues Jahrbuch für Mineralogie, Geologie, und Palæontologie. ii Band, p. 408. Stuttgart, 1881.

94.

WHITE, C. A. Fossils of the Indiana rocks, No. 2. <Indiana, Department of Geology and Natural History, Eleventh Annual Report. John Collet, State Geologist, 1881; pp. 347–401, pls. xxxvii–lv. Indianapolis, 1882.

Same. Indianapolis, 1882; 8vo, pp. 347–401, with 19 plates and the index for the whole volume. Fifty separates printed without title-page or repaging, and without date.

The object oft his memoir, like that of entry No. 75, is largely that of popular instruction. The greater part of the species here described and figured are republished from the works of other authors, only four of the species being new. Twelve of the plates are devoted to figures of fossil corals, which figures were engraved many years ago by J. W. Van Cleve, to accompany a work on fossil corals by himself, which he did not live to publish or to finish. There are 29 species of these corals here described and figured, besides 20 other species, all from Paleozoic rocks.

Description of fossils.

UPPER SILURIAN.

Page

Molluscoa.
Cephalopoda.
Gyroceras, Meyer 355
G. elrodi, n s., White, 1882, pl. xxxvii, fig. 1, and pl. xxxviii, figs. 2–4 356–358
Orthoceras, Breynius 358
O. annulatum, Sowerby, 1818, pl. xxxviii, fig. 1 358

SUBCARBONIFEROUS.

Gasteropoda.
Patella, Linnæus 359
P. levettei, n. s., White, 1882, pl. xxxix, figs. 4 and 5 359
Bellerophon, Montfort 359
B. sublævis, Hall, 1858, pl. xl, figs. 5–7 359–360
B. gibsoni, n. s., White, 1882, pl. xli, figs. 4–6 360–361
Brachiopoda.
Terebratula, Llhwyd 361
T. formosa, Hall, 1858, pl. xxxix, figs. 6–8 361
Bryozoa.
Archimedes, Lesueur 361
A. laxa, Hall, 1857, pl. xli, fig. 7 361–362
Radiata.
Echinodermata.
Lepidesthes, M. & W. 362
L. colletti, White, 1878, pl. xli, figs. 2 and 3 362–363
Agaricocrinus, Troost 363
A. springeri, n. s., White, 1882, pl. xl, figs. 2–4 363–364
Onychocrinus, Lyon & Casseday 365
O. exsculptus, Lyon & Casseday, 1860, pl. xl, fig. 1 365–366
O. ramulosus, Lyon & Casseday, 1859, pl. xxxix, figs. 2 and 3 366–367
Cyathocrinus, Miller 367
C. multibrachiatus, Lyon & Casseday, 1859, pl. xxxix, fig. 1 367
Platycrinus, Miller 368
P. hemisphericus, M. & W., 1865, pl. xli, fig. 1 368–369
Protista.
Porifera.
Palæacis, Haime 369
P. cuneatus, M. & W., 1860, pl. xli, figs. 8 and 9 369–370

Page.

COAL-MEASURES.

Mollusca.

Gasteropoda.

Polyphemopsis, Portlock 370

P. nitidula, M. & W., pl. xlii, figs. 7 and 8 370–371

Conchifera.

Nucula, Lamarck 371

N. ventricosa, Hall, 1858, pl. xlii, figs. 9 and 10 371–372

Brachiopoda.

Spirifer, Sowerby 372

Subgenus *Martinia*, McCoy 372

S. (Martinia) lineatus, Martin, pl. xlii, figs. 4–6 372–373

Productus, Sowerby 373

P. punctatus, Martin, pl. xlii, figs. 1–3 373

FOSSIL PLANTS.

Taonurus.

T. colletti, Lesquereux, 1870, pl. xliii, fig. 1 374

Sphenophyllum, Brongniart 374

S. schlotheimi, Brongniart, pl. xliii, fig. 2 374–375

S. emarginatum, Brongniart, pl. xliii, fig. 3 375

Van Cleve's Fossil Corals, identified by C. A. White, M. D 375

LOWER SILURIAN.

Streptelasma, Hall 376

S. corniculum, Hall, pl. li, figs. 2–4 376

Palæophyllum, Billings 377

P. divaricans, Nicholson, pl. lii, fig. 4 377–378

Favistella, Hall 378

F. stellata, Hall, pl. xliv, figs. 1 and 2 378

Protarea, Edwards & Haime 378

P. vetusta, Edwards & Haime, pl. xlix, fig. 4 378–379

Constellaria, Dana 379

C. antheloidea, Hall, pl. xlvi, figs. 1–3 379–380

Monticulipora, d'Orbigny 380

M. frondosa, d'Orbigny, pl. xlviii, figs. 2 and 3 380–381

UPPER SILURIAN.

Lyellia, Edwards & Haime 381

L. americana, Edwards & Haime, pl. xlvii, fig. 5 381–382

Halysites, Fischer 382

H catenulata, Linnæus, pl. xlvi, figs. 4–7 382

Heliolites, Dana 383

H. elegans, Hall, pl. xlviii, fig. 4 383

Favosites, Lamarck 383

F. favosus, Goldfuss, pl. lii, figs. 1 and 2 383–384

Cladopora, Hall 384

C. reticulata, Hall, pl. xlvii, fig. 6 384–385

Clathropora, Hall 385

C. frondosa, Hall, pl. lv, fig. 3 385–386

DEVONIAN.

Acervularia, Schweigger 386

A. davidsoni, Edwards & Haime, pl. xlix, fig. 2 386

Diphyphyllum, Lonsdale 387

D. archiaci, Billings, pl. l, fig. 1 387

D. stramineum, Billings, pl. xlviii, fig. 1 388

D. arundinaceum, Billings, pl. li, fig. 389–390

Eridophyllum, Edwards & Haime 390

E. strictum, Edwards & Haime, pl. xlix, fig. 1 390–391

Cystiphyllum, Lonsdale 391

C. vesiculosum, Goldfuss, pl. lv, figs. 1 and 2 391–392

Zaphrentis, Rafinesque 392

Z. rafinesquii, Edwards & Haime, pl. xlv, figs. 3–5 393

Amplexus, Sowerby 393

[illegible] xv, figs. 1 and 2 ..... 2[illegible]–384
W[illegible] 384
[illegible] ..... [illegible]
[illegible] pl. liii, figs. 1 and 2 ..... [illegible]
[illegible]son. [illegible]74, pl. liii, fig. 3 ..... [illegible]
[illegible] xv, fig. 2 ..... [illegible]
..... [illegible]
[illegible] figs. 1 and 2 ..... 2[illegible]–[illegible]
V[illegible] ..... [illegible]
..... [illegible]
[illegible] ..... [illegible]
[illegible] ..... [illegible]
[illegible] ..... [illegible]
[illegible] ..... [illegible]
[illegible] ii, figs. 4 and 5 ..... [illegible]

[illegible]CARBONIFEROUS.

[illegible] ..... 4[illegible]
[illegible] ii, fig. 3 ..... 4[illegible]

95.

[illegible]reous Paleontology in the United States for the [illegible]. Naturalist, vol. xvi, pp. 887–891. Philadelphia, 1[illegible]. [illegible], pp. 887–891. One hundred separates printed with the [illegible]ring.

[illegible] series 74 and 81.

96.

[illegible] on the Great Plains. <North American Review, [illegible]. 1[illegible]2.

[illegible] pages. Fifty separates printed without title-page [illegible]

[illegible] of the examination of the region of Eastern Colorado by a [illegible], Commissioner of Agriculture, of which the author was [illegible]

97.

[illegible] <Nature, 4to, vol. xxv, pp. 101–102. London [illegible]

[illegible] identity of *Paramelania* Smith, a proposed molluscan sub[illegible] Africa, with the fossil genus *Pyrgulifera* Meek, from [illegible] Wyoming.

98.

[illegible] attending the geological descent of some North [illegible] gill-bearing Mollusks. <Amer. Jour. Sci., 3d ser., [illegible]Haven, 1882.

[illegible] pp. 382–386. Twenty separates printed without [illegible]

[illegible] of this article is an extract from parts of an illustrated work, [illegible] No. 105. The opinion is advanced that the present gill [illegible] River system has been derived in part from the Laramie sea [illegible] exceeded it, by means of the persistence of their outlets as [illegible]

99.

WHITE, C. A. Artesian Wells upon the Great Plains; being the report of a geological commission appointed to examine a portion of the Great Plains east of the Rocky Mountains, and report upon the localities deemed most favorable for making experimental borings. Department of Agriculture, pp. 1–38, pl. i. Washington, 1882.

The map is a copy of part of sheet xi of the atlas of Colorado, published by the United States Geological Survey of the Territories.

100.

WHITE, C. A. On certain Cretaceous fossils from Arkansas and Colorado. <Proc. U. S. National Museum, vol. iv, pp. 136–139, pl. i. Washington, 1882.

Same. Washington, Government Printing Office, 1882. 8vo, pp. 136–139, and one plate. One hundred and fifty separates printed without title-page, covers, or repaging.

Six species are described and figured, two of which are new.

	Page.
Callianassa ulrichi, White, 1880, pl. i, figs. 10 and 11	137
Tubulostium dickhauti, White, 1880, pl. i, figs. 12 and 13	138
Cantharus? julesburgensis, n. s., White, 1882, pl. i, figs. 1 and 2	138
Lucina profunda, White, 1880, pl. i, figs. 5 and 6	138
Lucina cleburni, n. s., White, 1882, pl. i, figs. 3 and 4	139
Solemya bilix, White, 1880, pl. i, fig. 9	139
Pteria (Oxytoma) erecta, White, 1880, pl. i, figs. 7 and 8	139

101.

WHITE, C. A. [Review of] S. A. Miller: Description of some new and remarkable crinoids and other fossils of the Hudson River Group, and notice of Strotocrinus bloomfieldensis. (Journ. Cincinnati Soc. Nat. History. Vol. iv, No. 1 [April, 1881], pp. 69–77, pl. i.) <Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie. I Band, p. 307. Stuttgart, 1881.

102.

WHITE, C. A. [Review of] Henry Newton, E. M., and Walter P. Jenney, E. M.: Report on the Geology and resources of the Black Hills of Dakota. 4to, pp. 1–555, with Atlas. Washington, 1880. <Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie. II Band, pp. 216–218. Stuttgart, 1882.

103.

WHITE, C. A. [Review of] United States Geological Survey: Annual Report for 1881 of J. W. Powell, Director. Imperial 8vo, pp. 1–558, lxi plates, and 32 woodcuts. Washington, 1882. <Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie. II Band, pp. 365–366. Stuttgart, 1882.

104.

WHITE, C. A. Contributions to Invertebrate Paleontology, No. 2: Cretaceous fossils from the Western States and Territories. <Twelfth Annual Report of the United States Geological and Geographical Survey of the Territories (for the year 1878). pp. 1–38; appendix, pp. 38, 39, pls. xi–xviii. Washington, 1883.

Same. Washington: Government Printing Office, 1880. 8vo, pp. 1–39, and plates 11–18. Two hundred separates printed (author's edition) without repaging, but with title-page and covers, together with Contributions to Invertebrate Paleontology, Nos. 3, 4, 5, 6, 7, and 8. In 1883 100 additional copies of the same were printed in the same form. The title-page in both these cases differs from the title which heads the text by the omission of the word "Invertebrate."

Thirty-seven species are described and figured, five of which are new. On plate xviii ten species are also illustrated which were originally published by Dr. Shumard, but were never before illustrated.

CRETACEOUS.

	Page.
Actinozoa.	
Chastetes Fischer	7
C.? ? dimissus, White, 1879, pl. xii, fig. 14 *a*	7
Beaumontia, Edwards & Haime	8
B. ? solitaria, n. s., White, 1880, pl. xii, figs. 13 *a–c*	8
Echinodermata.	
Ophioderma	[illegible]
O.? bridgerensis, Meek, 1873, pl. xii, fig. 12 *a*	8–[illegible]
Conchifera.	
Ostrea, Linnæus	[illegible]
O. soleniscus, Meek, 1873, pl. xi, figs. 2 *a, b*	9–[illegible]
O. anomioides, Meek, 1873, pl. xi, figs. 4 *a, b*	10–[illegible]
Subgenus *Alectryonia*, Fischer	[illegible]
O. (*Alectryonia*) *blackii*, White, 1880, pl. xiv, figs. 1 *a, b*; pl. xvii, fig. 4 *a*	11–[illegible]
Exogyra, Say	[illegible]
E. winchelli, White, 1880, pl. xiii, figs. 1 *a–d*	[illegible]
E. forniculata, White, 1880, pl. xiv, figs. 2 *a, b*	13–14
Anomia, Linnæus	14
A. propatoris, n. s., White, 1880, pl. xii, figs. 15 *a, b*	14–15
Pteria, Scopoli	15
P.? ? stabilitatis, n. s., White, 1880, pl. xvii, fig. 3 *a*	15
Subgenus *Oxytoma*, Meek	15
P. (*Oxytoma*) *salinensis*, White, 1880, pl. xvi, figs. 2 *a, b*	15–16
Gervillia, Defrance	16
G. mudgeana, White, 1880, pl. xiv, figs. 3 *a, b*	16–17
Pinna, Linnæus	17
P. lakesii, White, 1879, pl. xi, figs. 1 *a, b*	17–18
Volsella, Scopoli	18
Subgenus *Brachydontes*, Swainson	18
V. (*Brachydontes*) *multilinigera*, Meek, 1873, pl. xi, fig. 3 *a*	18–19
Barbatia, Gray	19
B. barbulata, n. s., White, 1880, pl. xi, fig. 5 *a*	19
Cyrena, Lamarck	20
C. carletoni, Meek, 1873, pl. xii, figs. 16 *a, b*	20–21
Pharella, Gray	21
P.? penlei, Meek, 1873, pl. xi, figs. 6 *a, b*	21–22
Tapes, Mühlfeldt	22
T. hilgardi, Shumard, 1860, pl. xvi, figs. 3 *a–c*	22
Pachymya, Sowerby	23
P.? compacta, White, 1880, pl. xvii, figs. 4 *a, b*	23–24
Thracia, Leach	24
T. myæformis, White, 1880, pl. xvii, figs. 2 *a, b*	24
Gasteropoda.	
Melampus, Montfort	24
M.? antiquus, Meek, 1873, pl. xii, figs. 11 *a–d*	24–25
Melampus —— ? Meek, 1873, pl. xii, fig. 6 *a*	25
Neritina, Lamarck	25
N. bannisteri, Meek, 1873, pl. xii, figs. 10 *a–c*	25–26
N. pisiformis, Meek, 1873, pl. xii, figs. 9 *a–c*	26–27
Subgenus *Velatella*, Meek	27
N. (*Velatella*) *bellatula*, Meek, 1873, pl. xii, figs. 8 *a, b*	27–28
N. (*Velatella*) *carditoides*, Meek, 1873, pl. xii, fig. 7 *a*	28–29
Euspira, Agassiz	29
E. utahensis, White	29
Tessarolax, Gabb	29
T. hitzii, n. s., White, 1880, pl. xv, fig. 2 *a*	29–30
Lispodesthes, White	30
L.? obscurata, n. s., White, 1880, pl. xi, figs. 7 *a, b*	30–31
Turritella, Lamarck	31
T. spironema, Meek, 1873, pl. xii, fig. 3 *a*	31–32
Eulimella, Forbes	32
E.? chrysallis, Meek, 1873, pl. xii, fig. 4 *a*	32–33
E.? inconspicua, Meek, 1873, pl. xii, fig. 5 *a*	33
Vulrata Müller	33
V. nana, Meek, 1873, pl. xii, figs. 17 *a, b*	33–34

	Page.
Fusus, Lamarck	34
F.? utahensis, Meek, 1873, pl. xii, fig. 2 *a*	34
Fasciolaria, Lamarck	34
Subgenus *Piestocheilus*. Meek	34
F. (Piestocheilus) alleni, n. s., White, 1880, pl. xii, fig. 1 *a*	34–35
Cephalopoda.	
Prionocyclus, Meek	35
P. wyomingensis, Meek, 1876, pl. xv, figs. 1 *a–c*	35–36
Articulata.	
Crustacea.	
Paramithrax, Milne-Edwards	37
P.? walkeri, n. s., 1880, Whitfield, pl. xvi, fig. 1 *a*, and pl. xvii, fig. 1 *a*	37–38

Appendix to Contributions to Invertebrate Paleontology No. 2.

Cidaris hemigranosus, Shumard, pl. xviii, figs. 2 *a, b*	38
Gervillia gregaria, Shumard, pl. xviii, fig. 3 *a*	38
Nucula bellastriata, Shumard, pl. xviii, figs. 5 *a–c*	38
Nucula haydeni, Shumard, pl. xviii, figs. 6 *a, b*	38
Cardium choctawense, Shumard, pl. xviii, figs. 7 *a–c*	38
Cytheria lamarmsis, Shumard, pl. xviii, figs. 4 *a, b*	39
Ancyloceras annulatum, Shumard, pl. xviii, figs. 10 *a, b*	39
Scaphites vermiculus, Shumard, pl. xviii, fig. 8 *a*	39
Ammonites grayesonensis, Shumard, pl. xviii, figs. 9 *a, b*	39
Ammonites swallovii, Shumard, pl. xviii, fig. 1 *a*	39

105.

ITE, C. A. Contributions to Invertebrate Paleontology No. 3.—Certain Tertiary Mollusca from Colorado, Utah, and Wyoming. <Twelfth Annual Report of the U. S. Geol. and Geog. Surv. of the Terr. (for the year 1878), pp. 41–48, and pl. xix. Washington, 1883.

ue. Washington, Government Printing Office, 1880. 8vo, pp. 41–48, and pl. xix. Three hundred separates printed. See remarks following entry No. 104.

Ten species are described and figured, one of which is new.

	Page.
Conchifera.	
Unio, Retzius	41
U. shoshonensis, White, 1876, pl. xix, figs. 2 *a, b*	41–42
U. washakiensis, Meek, 1871, pl. xix, figs. 3 *a, b*	42–43
U. meeki, White, 1877, pl. xix, fig. 1 *a*	43–44
Gasteropoda.	
Planorbis, Müller	44
P. cirratus, White, 1879, pl. xix, figs. 5 *a–c*	44–45
Physa, Draparnaud	45
P. bridgerensis, Meek, 1873, pl. xix, figs. 10 *a, b*	45
Succinea, Draparnaud	45
Subgenus *Brachyspira*, Pfeiffer	45
S. (Brachyspira) papillispira, White, 1876, pl. xix, fig. 4 *a*	45–46
Pupa. Lamarck	46
P. arenula, White, 1876, pl. xix, figs. 8 *a, b*	46
P. atavuncula, n. s., White, 1880, pl. xix, fig. 9 *a*	46–47
Subgenus *Leucocheila*, Albers	47
P. (Leucocheila) incolata, White, 1876, pl. xix, figs. 7 *a–c*	47
Bythinella, Moquin-Tandon	48
B. gregaria, Meek, 1871, pl. xix, figs. 6 *a, b*	48

106.

ITE, C. A. Contributions to Invertebrate Paleontology No. 4.—Fossils of the Laramie Group. <Twelfth Annual Report of the U. S. Geol. and Geog. Surv. of the Terr. (for the year 1878), pp. 49–103, and pls. xx–xxx. Washington, 1883.

Same. Washington, Government Printing Office, 1880. 8vo, pp. 49–103, and pls. xx–xxx. Three hundred separates printed. See remarks following entry No. 104.

The object of this article is to give a list of all the mollusca that were known from the Laramie Group up to the time of publication, and to illustrate those which had not before been illustrated.

Page.

Conchifera.

Ostrea, Linnæus 56
O. glabra, M. &. H., 1857 56
Anomia, Linnæus 57
A. gryphorhynchus, Meek, 1872, pl. xxv, figs. 1 *c–c* 57
A. micronema, Meek, 1875, pl. xxv, figs. 2 *a–d* 57–58
Volsella, Scopoli 58
Subgenus *Brachydontes*, Swainson 58
V. (Brachydontes) regularis, White, 1878, pl. xxv, fig. 3 *a* 58–59
V. (Brachydontes) laticostata, White, 1878, pl. xxv, fig. 4 *a* 59
Axinæa, Poli 59
A. holmesiana, n. s., White, 1880, pl. xx, figs. 2 *a, b* 59–60
Nuculana, Link 60
N. inclara, White, 1878, pl. xxv, fig. 7 *a* 60–61
Anodonta, Cuvier 61
A. propatoris, White, 1877, pl. xxiv, figs. 2 *a–d* 61–62
A. parallela, White, 1878, pl. xxiv, fig. 3 *a* 62
Unio, Retzius 62
U. aldrichi, White, 1878, pl. xxix, figs. 2 *a, b* 62–63
U. goniambonatus, White, 1878, pl. xxix, figs. 1 *a, b* 63–64
U. brachyopisthus, White, 1876, pl. xxii, figs. 2 *a, b* 64
U. couesi, White, 1877, pl. xxvii, fig. 1 *a* 64–65
U. propheticus, White, 1876, pl. xxii, fig. 5 *a* 65
U. prosvitus, White, 1877, pl. xxii, figs. 3 *a–d* 65–66
U. endlichi, White, 1877, pl. xxvi, figs. 1 *a, b* 66–67
U. holmesianus, White, 1877, pl. xxii, figs. 4 *a–e* 67–68
U. danæ, M. & H.? pl. xxvii, figs. 2 *a, b* 68
U. cryptorhynchus, White, 1877, pl. xxiv, figs. 1 *a, b* 68–69
U. senectus, White, 1877, pl. xxviii, figs. 1 *a–c* 69
U. primævus, White, 1877, pl. xxix, figs. 3 *a, b* 70
U. priscus, M. & H 70
U. subspatulatus, M. & H 71
U. deweyanus, M. & H 71
U. vetustus, Meek 71
U. belliplicatus, Meek 71
U. gonionotus, White, 1876, pl. xxvi, figs. 2 *a–e* 71–72
Sphærium, Scopoli 72
S. planum, M. & H 72
S. recticardinale, M. & H 72
S. formosum, M. & H 72
S. subellipticum, M. & H 72
Corbicula, Megerle 72
C. obesa, White, 1878, pl. xxiii, figs. 3 *a–e* 72–73
C. cardiniæformis, White, 1878, pl. xxv, figs. 5 *a, b* 73
C. cleburni, White, 1878, pl. xxiii, figs. 1 *a–c* 73–74
C. cytheriformis, M. & H., pl. xxi, figs. 4 *a–d* 74
C. nebrascensis, M. & H 74
C. occidentalis, M. & H., 1856, pl. xxi, figs. 3 *a–c* 75
Subgenus *Leptesthes*, Meek 75
C. (Leptesthes) fracta, Meek, 1871, pl. xxiii, figs. 2 *a–e* and pl. xxi, fig. 5 *a* 75–77
C. (Leptesthes) planumbona, Meek, 1875, pl. xxi, figs. 2 *a–d* 77–78
C. (Leptesthes) macropistha, White, 1878, pl. xxiii, figs. 4 *a–f* 78–79
C. (Leptesthes) subelliptica, M. & H 79
Subgenus *Veloritina*, Meek 79
C. (Veloritina) durkeei, Meek 79–80
Corbula, Bruguière 80
C. subtrigonalis, M. & H 80
C. perundata, M. & H 80
C. crassatelliformis, Meek 80
C. tropidophora, Meek 80

	Page.
***C. mactriformis*, M. & H**	80
C. undifera*, Meek, 1873, pl. xxix, figs. 4 *a–f	80–81
C. undifera* var. *subundifera*, White, 1880, pl. xxix, figs. 5 *a–e	81–82
***C. pyriformis*, Meek**	82
Gasteropoda.	
***Rhytophorus*, Meek**	82
***R. priscus*, Meek**	82
R. meekii*, n. s., White, 1880, pl. xxx, figs. 8 *a*, *b	82–83
***Acroloxus*, Beck**	83
***A. minutus*, M. & H**	83
***Planorbis*, Müller**	83
***P. convolutus*, M. & H.**	83
Subgenus *Bathyomphalus*, Agassiz	83
***P. (Bathyomphalus) amplexus*, M. & H**	83
***P. (Bathyomphalus) planoconvexus*, M. & H**	83
***Limnæa*, Lamarck**	84
***L. nitidula*, Meek**	84
Subgenus *Pleurolimnæa*, Meek	84
***L. (Pleurolimnæa) tenuicostata*, M. & H**	84
Acella, Haldeman	84
A. haldemani*, White, 1878, pl. xxx, figs. 9 *a*, *b	84
Physa, Draparnaud	84
P. felix*, White, 1878, pl. xxii, fig. 1 *a	84–85
P. copei*, White, 1877, pl. xxiv, figs. 4 *a*, *b	85
Physa ?* White, 1880, pl. xxx, fig. 11 *a	85
Bulinus, Adanson	86
B. atavus*, White, 1877, pl. xxiv, figs. 5 *a*, *b	86
B. disjunctus*, White, 1879, pl. xxiv, figs. 6 *a*, *b	86–87
***B. longiusculus*, M. & H**	87
***B. rhomboideus*, M. & H**	87
***B. subelongatus* M. & H**	87
Vitrina, Draparnaud	87
***V. obliqua*, M. & H**	87
Hyalina, Férussac	87
***H. ? occidentalis*, M. & H**	87
***H. ? evansi*, M. & H**	87–88
Helix, Linnæus	88
***H. vetusta*, M. & H**	88
Thaumastus, Albers	88
***T. limnæformis*, M. & H**	88
Columna, Perry	88
***C. teres*, M. & H**	88
***C. vermicula*, M. & H**	88
Neritina, Lamarck	88
N. volvilineata*, White, 1876, pl. xxi, figs. 6 *a*, *b	88–89
N. naticiformis*, White, 1878, pl. xxx, figs. 3 *a*, *b	89
Subgenus *Velatella*, Meek	89
N. Velatella) baptista*, White, 1878, pl. xxix, figs. 6 *a*, *b	89–90
Cerithidea, Swainson	90
Subgenus *Pirenella*, Gray	90
***C. (Pirenella) nebrascensis*, M. & H**	90
***Goniobasis*, Lea**	90
G. cleburni*, White, 1876, pl. xxx, figs. 4 *a–d	91
G. chrysallis*, Meek, 1871, pl. xxx, figs. 6 *a*, *b	91–92
G. chrysalloidea*, White, 1876, pl. xxx, figs. 5 *a*, *b	92
G. endlichi*, White, 1878, pl. xxx, figs. 7 *a–c	92–93
G. macilenta*, White, 1879, pl. xxx, fig. 10 *a	93
***G. gracilenta*, M. & H**	94
***G. convexa*, M. & H**	94
***G. incensata*, M. & H**	94
***G. sublævis*, M. & H**	94
***G. ? omitta*, M. & H**	94
***G. ? subtortuosa*, M. & H**	94
***G. nebrascensis*, M. & H**	94

	Page.
G. tenuicarinata, M. & H	94
Melania, Lamarck	94
M.? insculpta, Meek, 1873, pl. xx, fig. 4 *a*	94–95
M. wyomingensis, Meek, 1873, pl. xxviii, figs. 6 *a*, *b*	95–96
Pyrgulifera, Meek	96
P. humerosa, Meek	96
Cassiopella, White	96–97
C. turricula, White, 1876, pl. xxvii, figs. 3 *a–g*	97
Hydrobia, Hartmann	97
H. anthonyi, M. & H	97
H. warrenana, M. & H	97
H. subconica, M. & H	97
H.? eulimoides, M. & H	97
Micropyrgus, Meek	98
M. minutulus, M. & H	98
Viviparus, Montfort	98
V. plicapressus, White, 1876, pl. xxviii, figs. 3 *a*, *b*	98
V. prudentius, White, 1878, pl. xxviii, figs. 5 *a*, *b*	98–99
V. couesi, White, 1878, pl. xxx, fig. 1 *a*	99
V. leai, M. & H	100
V. retusus, M. & H	100
V. peculiaris, M. & H	100
V. trochiformis, M. & H	100
V. reynoldsianus, M. & H	100
V. leidyi, M. & H	100
V. conradi, M. & H	100
Tulotoma, Haldeman	100
T. thompsoni, White, 1876, pl. xxviii, figs. 2 *a–h*	100–101
Campeloma, Rafinesque	101
C. vetula, M. & H	101
C. multistriata, M. & H	101
C. multilineata, M. & H	101
C. macrospira, Meek, pl. xxx, fig. 2 *a*	102
Valvata, Müller	102
V. subumbilicata, M. & H	102
V. parvula, M. & H	102
V.? montanaensis, Meek	102
Odontobasis, Meek	102
O. buccinoides, White, 1876, pl. xx, figs. 3 *a*, *b*	102–103
O.? formosa, White, 1878, pl. xxviii, fig. 7 *a*	103

107.

WHITE, C. A. Contributions to Invertebrate Paleontology, No. 5. Triassic Fossils of Southeastern Idaho. <Twelfth Annual Report U. S. Geol. and Geog. Surv of the Terr. (for the year 1878), pp. 105–118, pls. xxxi–xxxii. Washington, 1883.

Same. Washington: Government Printing Office, 1880, 8vo, pp. 105–118, pls. xxxi–xxxii. Three hundred separates printed. See remarks following entry No. 93.

This article is essentially a republication of Paleontological paper No. 9. (See entry No. 71.)

	Page.
Brachiopoda.	
Terebratula, Llhwyd	108
T. semisimplex, White, 1879, pl. xxxi, figs. 3 *a–c*	108–109
T. augusta, H. & Whitf.?	109
Conchifera.	
Aviculopecten, McCoy	109
A.? pealei, White, 1879, pl. xxxii, fig. 4 *a*	109–110
A.? altus, White, 1879, pl. xxxii, fig. 3 *a*	110
A.? idahoensis, Meek, 1872, pl. xxxii, fig. 2 *a*	110–111
Cephalopoda.	
Meekoceras, Hyatt	112
M. aplan[a]tum, White, 1879, pl. xxxi, figs. 1 *a–d*	112–113
M. mushbachianum, White, 1879, pl. xxxii, figs. 1 *a–d*	114

Page.
M. gracilitatis, White, 1879, pl. xxxi, figs. 2 *a–d* 115–116
M. gracilitatis var., White, 1880 116
Arcestes, Suess 116
A.? cirratus, White, 1879 116–117
Arcestes ——? White? 1880 117–118

108.

WHITE, C. A. Contributions to Invertebrate Paleontology, No. 6.—Certain Carboniferous Fossils from the Western States and Territories. <Twelfth Annual Report U. S. Geol. and Geog. Surv. of the Terr. (for the year 1878), pp. 119–141, and pls. xxxiii–xxxvi. Washington, 1883.

ame. Washington: Government Printing Office, 1883. 8vo, pp. 119–141, and pls. xxxiii–xxxvi. Three hundred separates printed. See remarks following entry No. 104.

Twenty-seven species of fossils are described and illustrated, all of which had been previously published.

Page.
Actinozoa.
Amplexus, Sowerby 120
A. zaphrentiformis, White, 1876, pl. xxxiii, figs. 1 *a–d* 120
Acervularia, Schweigger 120
A. adjunctiva, White, 1880, pl. xxxv, figs. 1 *a–d* 120–121
Leptopora, Winchell 121
L. winchelli, White, 1879, pl. xxxiv, fig. 11 *a* 121–122
Echinodermata.
Platycrinus, Miller 122
P. haydeni, Meek, 1873, pl. xxxiii, fig. 7 *a* 122–123
Lecythiocrinus, White 123
L. olliculæformis, White, 1880, pl. xxxv, figs. 2 *a, b* 124
Eupachycrinus, M. & W 124
E. platybasis, White, 1876, pl. xxxiii, fig. 8 *a* 124–125
Cyathocrinus, Miller 125
C. stillativus, White, 1880, pl. xxxv, figs. 3 *a, b* 125
Erisocrinus, M. & W 126
E. typus, M. & W., 1866, pl. xxxiii, fig. 5 *a* 126–127
E. (Ceriocrinus) planus, White, 1880, pl. xxxv, figs. 5 *a, b* 127–128
E. (Ceriocrinus) inflexus, Geinitz, 1866, pl. xxxiv, figs. 9 *a, b* 128
Poteriocrinus, Miller 128
P. montanaensis, Meek, 1873, pl. xxxiii, fig. 6 *a* 128–129
Rhodocrinus, Miller 129
R. vesperalis, White, 1880, pl. xxxv, figs. 4 *a, b* 129–130
Archæocidaris, McCoy 130
A. eratis, White, 1876, pl. xxxiii, fig. 2 *a* 130
A. dininnii, White, 1880, pl. xxxv, figs. 6 *a–c* 131
Polyzoa.
Ptilodyctia, Lonsdale 131
P. triangulata, White, 1878, pl. xxxiii, figs. 3 *a–c* 131–132
Brachiopoda.
Productus, Sowerby 132
P. giganteus, Martin, pl. xxxvi, figs. 1 *a–c* 132
Rhynchonella, Fischer 133
R. endlichi, Meek, 1875, pl. xxxiii, figs. 4 *a, b*, and pl. xxxvi, figs. 2 *a, b* 133–134
Retzia, King 134
R. wooseri, White, 1879, pl. xxxiv, figs. 8 *a, b* 134
Spirifer, Sowerby 135
S. agelaius, Meek, 1873, pl. xxxiv, figs. 10 *a, b* 135
Conchifera.
Nucula, Lamarck 136
N. perumbonata, White, 1879, pl. xxxiv, figs. 7 *a, b* 136
Nuculana, Link 136
N. obesa, White, 1879, pl. xxxiv, figs. 2 *a–c* 136–137
Allorisma, King 137
A.? gilberti, White, 1879, pl. xxxiii, figs. 9 *a, b* 137–138

Page.
Gasteropoda.
Bellerophon, Montfort 138
B. subpapillosus, White, 1879, pl. xxxiv, fig. 3 *a* 138
Naticopsis, McCoy 139
N. remex, White, 1876, pl. xxxiv, fig. 6 *a* 139
Murchisonia, d'Archiac 139
M. terebra, White, 1879, pl. xxxiv, fig. 4 *a* 139–140
Pleurotomaria, Defrance 140
P. taggerti, Meek, 1874, pl. xxxiv, figs. 1 *a*, *b* 140
P. grayvillensis, Norwood & Pratten, 1855, pl. xxxiv, fig. 5 *a* 140–141

109.

WHITE, C. A. Contributions to Invertebrate Paleontology No. 7. Jurassic Fossils from the Western Territories. <Twelfth Annual Report of the U. S. Geol. and Geog. Surv. of the Terr. (for the year 1878), pp. 143–153, pls. xxxvii–xxxviii. Washington, 1883.

Same. Washington: Government Printing Office, 1880. 8vo, pp. 143–153, and plates xxxvii–xxxviii. Three hundred separates printed. See remarks following entry No. 93.

Sixteen species are described and figured, part of which are new, and the genus Lyosoma is diagnosed.

Page.
Camptonectes (Agassiz), Meek 143
C. platessiformis, White, 1876, pl. xxxvii, fig. 5 *a* 143–144
Aviculopecten, McCoy 144
A.? superstrictus, n. s., White, 1880, pl. xxxvii, figs. 4 *a*, *b* 144
Gervillia, Defrance 145
G. montanaensis, Meek, 1873, pl. xxxvii, figs. 1 *a*, *b* 145
Volsella, Scopoli 145
V. subimbricata, Meek, 1873, pl. xxxvii, figs. 2 *a–c* 145–146
V. (Modiolina) platynota, n. s., White, 1880, pl. xxxvii, figs. 3 *a*, *b* 146–147
Mytilus, Linnæus 147
M. whitei, Whitfield, 1877, pl. xxxvii, fig. 9 *a* 147
Trigonia, Bruguière 147
T. montanaensis, Meek, 1873, pl. xxxviii, fig. 2 *a* 147–148
T. americana, Meek, 1873, pl. xxxviii, figs. 1 *a*, *b* 148
Astarte, Sowerby 149
A. nackardi, n. s., White, 1880, pl. xxxvii, figs. 6 *a*, *b* 149
Cardinia, Agassiz 149
C. præcisa, n. s., White, 1880, pl. xxxvii, figs. 7 *a*, *b* 149–150
Tancredia, Lycett 150
T. extensa, White, 1880, pl. xxxviii, fig. 4 *a* 150
Pholadomya, Sowerby 150
P. kingii, Meek, 1873, pl. xxxviii, figs. 3 *a*, *b* 150–151
Goniomya, Agassiz 151
G. montanaensis, Meek, 1873, pl. xxxvii, fig. 8 *a* 151
Myacites (Schlotheim), Munster 151
M. subcompressus, Meek, 1873, pl. xxxviii, figs. 5 *a–b* 151–152
**Lyosoma*, n. g., White, 1880 152–153
L. powelli, White, 1876, pl. xxxviii, figs. 6 *a–d* 153

110.

WHITE, C. A. Contributions to Invertebrate Paleontology No. 8. Fossils from the Carboniferous Rocks of the Interior States. <Twelfth Annual Report of the U. S. Geol. and Geog. Surv. of the Terr. (for the year 1878). pp. 155–171, pls. xxxix–xlii. Washington, 1883.

Same. Washington: Government Printing Office, 1880. 8vo, pp. 155–171, and plates xxxix–xlii. Three hundred separates printed. See remarks following entry No. 93. The series of contributions closes with No. 8, and it is not again resumed in that form.

Twenty-eight species are described and figured, part of which are new.

* λυω, to loosen, and σωμα, the body.

Page.

Radiata.
Actinaria.
Zaphrentis, Rafinesque ... 155
Z. elliptica, White, 1862, pl. xxxix, figs. 4 *a*, *b* ... 155–156
Z. calceola, White & Whitf., 1862, pl. xxxix, figs. 6 *a–d* ... 156
Hadrophyllum, Edwards & Haine ... 156
H. glans, White, 1862, pl. xxxix, figs. 5 *a*, *b* ... 156–157
Lophophyllum, Edwards & Haine ... 157
L. expansum, White, 1876, pl. xxxix, figs. 4 *a*, *b* ... 157
Chonophyllum, Edwards & Haine ... 157
C. sedaliense, n. s., White, 1880, pl. xxxix, fig. 1 *a* ... 157
Michilinia, De Koninck ... 157
M.? placenta, n. s., White, 1880, pl. xxxix, figs. 1 *a–d* ... 157–158
M. expansa, n. s., White, 1880, pl. xxxix, figs. 2 *a*, *b* ... 158
Lithostrotion, Fleming ... 159
L. microstylum, n. s., White, 1880, pl. xl, fig. 7 *a* ... 159
L. mamillare, Castelnau, pl. xl, figs. 6 *a*, *b* ... 159–160
Echinodermata.
Platycrinus, Miller ... 160
P. bonoensis, White, 1878, pl. xl, fig. 5 *a* ... 160–161
Scaphiocrinus, Hall ... 161
S. gibsoni, White, 1878, pl. xl, fig. 4 *a* ... 161–162
S. gurleyi, White, 1878, pl. xl, fig. 3 *a* ... 162
Actinocrinus, Miller ... 162
A. wachsmuthi, n. s., White, 1880, pl. xl, figs. 1 *a*, *b* ... 162–163
Lepidesthes, M. & W ... 163
L. colleti, White, 1878, pl. xl, figs. 2 *a*, *b* ... 163–164
Molluscoa.
Molluscoidea.
Brachiopoda.
Orthis, Dalman ... 164
O. thiemei, White, 1860, pl. xli, figs. 4 *a–d* ... 164–165
Rhynchonella, Fischer ... 165
R. ottumwa, White, 1862, pl. xli, figs. 5 *a–c* ... 165
Spirifer, Sowerby ... 165
S. subcardiiformis, Hall, 1858, pl. xli, figs. 2 *a–c* ... 165–166
Molluscoa, vera.
Conchifera.
Anthracoptera, Salter ... 166
A. polita, n. s., White, 1880, pl. xlii, figs. 5 *a*, *b* ... 166
Astartella, Hall ... 166
A. gurleyi, White, 1878, pl. xlii, figs. 6 *a*, *b* ... 166–167
Allorisma, King ... 167
A. marionensis, White, 1876, pl. xli, figs. 1 *a*, *b* ... 167–168
Gasteropoda.
Euomphalus, Sowerby ... 167
E. springvalensis, White, 1876, pl. xli, figs. 1 *a*, *b* ... 167–168
Platyceras, Conrad ... 168
P. tribulosum, n. s., White, 1880, pl. xli, figs. 6 *a*, *b* ... 168
Naticopsis, McCoy ... 168
N. monilifera, n. s., White, 1880, pl. xlii, figs. 3 *a–c* ... 168
Pleurotomaria, Defrance ... 169
P. broadheadi, n. s, White, 1880, pl. xlii, figs. 1 *a*, *b* ... 169
P. newportensis, n. s., White, 1880, pl. xlii, figs. 2 *a*, *b* ... 169
Pteropoda.
Conularia, Miller ... 170
C. crustula, n. s., White, 1880, pl. xlii, fig. 4 *a* ... 170
Cephalopoda.
Nautilus, Breynius ... 170
N. danvillensis, White, 1878, pl. xlii, fig. 7 *a* ... 170–171
Articulata.
Vermes.
Serpula, Linnæus ... 171
S. insita, White, 1878, pl. xlii, fig. 8 *a* ... 171

111.

WHITE, C. A. Forestry in the Great Prairie Region. <American Journal of Forestry, vol. i (May No.), pp. 366–370. Cincinnati, 1883.

Same. Cincinnati, 1883. 8vo, pp. 1–6. Forty separates printed without title-page, or covers, but repaged.

This Journal was started at the beginning of 1883, with Dr. F. B. Hough as editor and Robert Clarke & Co. as publishers. It was published one year and then discontinued.

112.

WHITE, C. A. The reversion of Sunflowers at night. <Nature. 4to, vol. [xxvii?] p. 241. London and New York, 1883.

Sunflowers are observed to turn to the eastward immediately after dark.

113.

WHITE, C. A. New Molluscan forms from the Laramie and Green River groups; with discussion of some associated forms heretofore known. <Proc. U. S. National Museum, vol. v, pp. 94–99, pls. i–ii. Washington, 1883.

Same. Washington: Government Printing Office, 1882. 8vo, pp. 94–99, and two plates. One hundred and fifty separates printed, together with the paper of the next entry, without title-page, covers, or repaging.

Six species are described and figured as new; and *Paramelania*, Smith, is figured and compared with *Pyrgulifera*, Meek. Also the discovery of the under valve of *Anomia micronema* is announced and figured; and the prismatic structure of that valve suggested as the cause that it has so generally been destroyed.

	Page.
Unio, Retzius	94
U. clinopisthus, n. s., White, 1882, pl. iii, figs. 1 and 2	94
Corbicula, Mühlfeldt	94
C. berthoudi, n. s., White, 1882, pl. iv, figs. 1–3	94–95
C. augheyi, n. s., White, 1882, pl. iv, figs. 4–6	95
Neritina, Lamarck	95
N. bruneri, n. s., White, 1882, pl. iv, figs. 7 and 8	95–96
Melanopsis, Lamarck	96
M. americana, n. s., White, 1882, pl. iv, figs. 9 and 10	96
Campeloma, Rafinesque	97
C. producta, n. s., White, 1882, pl. iii, figs. 7–9	97

114.

WHITE, C. A. The Molluscan Fauna of the Truckee Group, including a new form. <Proc. U. S. National Museum, vol. v, pp. 99–101, pl. i. Washington, 1883.

Same. Washington: Government Printing Office, 1882. 8vo, pp. 99–101, and one plate. One hundred and fifty separates printed, together with the paper of the last entry, without title-page, covers, or repaging.

Nine species are figured, which constitute the entire molluscan fauna of the Truckee Group as it was then known to the author. A species of *Latia* is described, which is the only one of that genus yet known in North America.

	Page.
Melania sculptilis, Meek, pl. v, fig. 1	100
Melania subsculptilis, Meek, pl. v, fig. 2	100
Melania taylori, Gabb, pl. v, fig. 3	100
Lithasia antiqua, Gabb, pl. v, fig. 4	100
Carinifex (*Vorticifex*) *tryoni*, Meek, pl. v, figs. 5–7	100
Carinifex (*Vorticifex*) *binneyi*, Meek, pl. v, figs. 8 and 9	100
Ancylus undulatus, Meek, pl. v, figs. 10 and 11	100
Sphærium rugosum, Meek, pl. v, figs. 14–16	100
Sphærium? idahoense, Meek, pl. v, figs. 12 and 13	100
Latia dallii, n. s., White, 1882, pl. v, figs. 17–20	100–101

115.

WHITE, C. A. A Review of the Non-Marine Fossil Mollusca of North America. <Third Annual Report of the Director of the United States Geological Survey to the Secretary of the Interior, 1881–'82. By J. W. Powell, Director, pp. 403–550 and pls. p. i–xxxii. Washington, 1883.

Same. Washington: Government Printing Office, 1883. Imp. 8vo, pp. 1–80 and pls. 1–32. One hundred copies printed early in 1883 with paging, numbering of the plates, and title-page separate from that of the volume.

Same. One hundred more copies printed at the time of the issuance of the volume in 1884.

This memoir contains a discussion of the families which are represented in the brackish and fresh water deposits, an annotated catalogue of all the known species in the order in which the formations occur, general discussion of the conditions which prevailed when the mollusks lived, and the manner in which the lines of descent of a part of them have been continued to the present time. Two hundred and twenty-seven species are noticed, all of which are illustrated. Although the volume of which this work is an extract, bears the date 1883 upon its title-page, the volume, as a whole, was not issued until near the middle of 1884.

[The pagination in the separates is different from that in the volume. Both are referred to.]

DEVONIAN.	Page.
Strophites grandaeva, Dawson, pl. i, fig. 1	49, 455
Anodonta? angustata (Vanuxem), Hall, pl. i, figs. 2 and 3	18, 424
Anodonta? cattskillensis (Vanuxem), Hall, pl. i, fig. 4	18, 424
CARBONIFEROUS.	
Pupa vetusta, Dawson, pl. ii, figs. 1 and 2	50, 456
Dawsonella meeki, Bradley, pl. ii, figs. 3 and 4	47, 453
Anthracopupa ohioensis, Whitfield, pl. ii, figs. 5–8	50, 456
Pupa bigsbyi, Dawson, pl. ii, figs. 9 and 10	50, 456
Pupa vermillionensis, Bradley, pl. ii, figs. 13 and 14	50, 456
Zonites priscus, Dawson, pl. ii, figs. 11 and 12	47, 453
Naiadites carbonaria, Dawson, pl. ii, fig. 15	19, 425
Naiadites elongata, Dawson, pl. ii, fig. 16	19, 425
Naiadites lævis, Dawson, pl. ii, fig. 17	19, 425
JURASSIC AND TRIASSIC. (?)	
Unio stewardii, White, pl. iii, fig. 1	20, 426
Unio nucalis, M. & H., pl. iii, figs. 2–4	20, 426
Unio cristonensis, Meek, pl. iii, fig. 5	19, 425
Planorbis veternus, M. & H., pl. iii, fig. 6	40, 446
Valvata scabrida, M. & H., pl. iii, fig. 7	64, 470
Viviparus gillianus, M. & H., pl. iii, fig. 8	60, 470
Lioplacodes veternus, M. & H., pl. iii, fig. 9	60, 470
Neritina nebrascensis, M. & H., pl. iii, figs. 10, 11	51, 457
CRETACEOUS.	
Margaritana nebrascensis, M. & H., pl. iv, figs. 1 and 2	21, 427
Cyrena dakotensis, M. & H., pl. iv, figs. 3 and 4	30, 436
Physa ——? White, 1879, pl. iv, fig. 5	38, 444
Unio penultimus, Gabb, pl. v, fig. 1	21, 427
Unio hubbardii, Gabb, pl. v, figs. 2 and 3	21, 477
Cyrena carletoni, Meek, pl. v. figs. 4 and 5	30, 436
Anomia propatoris, White, pl. v, figs. 6 and 7	16, 422
Neritina (Velatella) bellatula, Meek, pl. v, figs. 8 and 9	52, 458
Neritina (Velatella) carditoides, Meek, pl. v, fig. 10	52, 458
Neritina banisteri, Meek, pl. v, figs. 11 and 12	52, 458
Melampus? antiquus, Meek, pl. v, figs. 13–16	38, 444
Melampus? ——, Meek, 1873, pl. v, fig. 17	38, 444
Physa carletoni, Meek, pl. v, fig. 18	43, 449
Valvata nana, Meek, pl. v, figs. 19 and 20	64, 470

BEAR RIVER, LARAMIE.

	Page
Unio belliplicatus, Meek, pl. vi, figs. 1–3	24, 43
Pyrgulifera humerosa, Meek, pl. vi, figs. 4–6	54, 44
Goniobasis cleburni, White, pl. vi, figs. 7–9	56, 44
Goniobasis chrysalloidea, White, pl. vi, figs. 10 and 11	56, 44
Goniobasis macilenta, White, pl. vi, fig. 12	56, 44
Goniobasis chrysalis, Meek, pl. vi, figs. 13 and 14	56, 44
Limnæa (*Limnophysa*) *nitidula*, Meek, pl. vi, figs. 15 and 16	38, 44
Physa ——? White, 1880, pl. vi, fig. 17	43, 44
Limnæa (*Acella*) *haldemani*, White, pl. vi, figs. 19 and 20	39, 44
Unio vetustus, Meek, pl. vii, figs. 1–4	24, 43
Neritina naticiformis, White, pl. vii, figs. 5 and 6	52, 43
Goniobasis endlichi, White, pl. vii, figs. 7–9	57, 44
Viviparus couesii, White, pl. viii, fig. 1	61, 44
Rhytophorus priscus, Meek, pl. viii, figs. 2 and 3	38, 44
Rhytophorus meekii, White, pl. viii, figs. 4 and 5	38, 44
Campeloma macrospira, Meek, pl. viii, figs. 6 and 7	63, 44
Corbicula (*Veloritina*) *durkeei*, Meek, pl. viii, figs. 8–11	31, 43
Corbicula pyriformis, Meek, pl. viii, figs. 12–16	35, 44

LARAMIE.

Ostrea glabra, M. & H., pls. ix–xi, and pl. xii, fig. 1	15, 43
Ostrea subtrigonalis, Evans & Shumard, pl. xii, figs. 2–5	15, 43
Anomia micronema, Meek, pl. xii, figs. 6–11	16, 43
Anomia gryphorhynchus, Meek, pl. xii, figs. 12–15	16, 43
Volsella (*Brachydontes*) *regularis*, White, pl. xiii, fig. 1	17, 43
Volsella (*Brachydontes*) *laticostata*, White, pl. xiii, fig. 2	17, 43
Unio proavitus, White, pl. xiii, figs. 3–6	27, 43
Unio gonionotus, White, pl. xiii, figs. 7–10	27, 43
Unio priscus, M. & H., pl. xiv, fig. 1	26, 43
Unio subspatulatus, Meek, pl. xiv, figs. 2 and 3	25, 43
Unio primævus, White, pl. xiv, figs. 4 and 5	26, 43
Unio cryptorhynchus, White, pl. xiv, figs. 6 and 7	25, 43
Unio endlichi, White, pl. xv, figs. 1 and 2	26, 43
Unio propheticus, White, pl. xv, fig. 3	27, 43
Unio aldrichi, White, pl. xv, figs. 4, 5	27, 43
Unio couesii, White, pl. xvi, fig. 1	26, 43
Unio holmesianus, White, pl. xvi, figs. 2–6	27, 43
Unio brachyopisthus, White, pl. xvi, figs. 7 and 8	27, 43
Unio danæ, M. & H., pl. xvii, figs. 1–3	25, 43
Unio deweyanus, M. & H., pl. xvii, figs. 4 and 5	25, 43
Corbicula occidentalis, M. & H., pl. xvii, figs. 6 and 7, pl. xxiii, figs. 1–6	31, 43
Sphærium planum, M. & H., pl. xvii, fig. 8	33, 43
Sphærium recticardinale, M. & H., pl. xvii, fig. 9	33, 43
S. subellipticum, M. & H., pl. xvii, fig. 10	33, 43
S. formosum, M. & H., pl. xvii, fig. 11	33, 43
Unio mendax, White, pl. xviii, figs. 3–5	27, 43
Unio danæ, M. & H.. ? pl. xviii, figs. 1 and 2	27, 43
Corbula undifera, Meek, pl. xviii, figs. 6–9	36, 44
Corbula undifera var. *subundifera*, White, pl. xviii, figs. 10 and 11	36, 44
Corbula mactriformis, M. & H., pl. xviii, figs. 12–15	36, 44
Unio senectus, White, pl. xix, figs. 1 and 2	26, 43
Unio goniambonatus, White, pl. xix, figs, 3 and 4	27, 43
Anodonta parallela, White, pl. xix, fig. 5	23, 43
Anodonta propatoris, White, pl. xix, figs. 6–9	23, 43
Corbula subtrigonalis, M. & H., pl. xix, figs. 10–17	36, 44
Corbicula (*Leptesthes*) *fracta*, Meek, pl. xx, figs. 1–6	33, 43
Corbicula cleburni, White, pl. xx, figs. 7–9	31, 43
Corbicula subelliptica, M. & H., pl. xx, figs. 10 and 11	31, 43
Corbicula nebrascensis, M. & H., pl. xx, figs. 12 and 13	31, 43
Pisidium vaginatum, White, pl. xx, figs. 14 and 15	34, 44
Corbicula bertholdi, White, pl. xxi, figs. 1–3	32, 43
Corbicula augheyi, n. s., White, 1883, pl. xxi, figs. 4–6	32, 43
Corbicula umbonella, Meek, pl. xxi, figs. 7–10	32, 43
Corbicula (*Leptesthes*) *macropistha*, White, pl. xxi, figs. 11–14	31, 43

	Page.
Corbicula cytheriformis, M. & H., pl. xxii, figs. 1–6	31, 437
Corbicula (*Leptesthes*) *planumbona*, Meek, pl. xxii, figs. 7–9	31, 437
Corbicula (*Leptesthes*) *cardiniæformis*, White, pl. xxii, figs. 10–15	31, 437
Cyrbicula obesa, White, pl. xxiii, figs. 7–11	31, 437
Neritina volvilineata, White, pl. xxiii, figs. 12 and 13	52, 458
Neritina bruneri, White, pl. xxiii, figs. 14 and 15	53, 459
Neritina (*Velatella*) *baptista*, White, pl. xxiii, figs. 16–20	52, 458
Melanopsis americana, n. g., White, 1883, pl. xxiii, figs. 21–23	55, 461
Limnæa (*Pleurolimnæa*) *tenuicostata*, M. & H., pl. xxiii, fig. 24	39, 445
Cassiopella turricula, White, pl. xxiii, figs. 25–29	58, 464
Viviparus retusus, M. & H., pl. xxiv, figs. 1–3	61, 467
Viviparus conradi, M. & H., pl. xxiv, figs. 4–6	61, 467
Viviparus leidyi, M. & H., pl. xxiv, fig. 7	61, 467
Viviparus leidyi var. *formosus*, M. & H., pl. xxiv, figs. 8 and 9	61, 467
Viviparus trochiformis, M. & H., pl. xxiv, figs. 10–16	61–467
Tulotoma thompsoni, White, pl. xxiv, figs. 17–22	61, 467
Viviparus peculiaris, M. & H., pl. xxiv, figs. 23 and 24	61, 467
Viviparus plicapressus, White, pl. xxiv, figs. 25 and 26	61, 467
Acroloxus minutus, M. & H., pl. xxiv, fig. 27	45, 451
Physa copei, White, pl. xxv, figs. 1 and 2	44, 450
Physa felix, White, pl. xxv, fig. 3	44, 450
Bulinus disjunctus, White, pl. xxv, figs. 4 and 5	45, 451
Bulinus atavus, White, pl. xxv, figs. 6 and 7	44, 450
Bulinus longiusculus, M. & H., pl. xxv, fig. 8	45, 451
Bulinus rhomboideus, M. & H., pl. xxv, fig. 9	45, 451
Bulinus subelongatus, M. & H., pl. xxv, figs. 10 and 11	44, 450
Helix kanabensis, White, pl. xxv, figs. 12–14	48, 454
Columna teres, M. & H., pl. xxv, fig. 15	48, 454
Columna vermicula, M. & H., pl. xxv, fig. 16	48, 454
Viviparus prudentius, White, pl. xxv, figs. 17 and 18	61, 467
Viviparus panguitchensis, White, pl. xxv, figs. 19–21	61, 467
Viviparus reynoldsianus, M. & H., pl. xxv, figs. 22 and 23	61, 467
Thaumastus limnæiformis, M. & H., pl. xxv, fig. 24	48, 454
Melania wyomingensis, Meek, pl. xxvi, figs. 1–3	54, 460
Melania insculpta, Meek, pl. xxvi, figs. 4 and 5	54, 460
Goniobasis conveza, M. & H., pl. xxvi, figs. 6 and 7	57, 463
Goniobasis conveza var. *impressa*, M. & H., pl. xxvi, figs. 8 and 9	57, 463
Goniobasis? omitta, M. & H., pl. xxvi, fig. 10	57, 463
Goniobasis tenuicarinata, M. & H., pl. xxvi, fig. 11	57, 463
Goniobasis gracilenta, Meek, pl. xxvi, figs. 12 and 13	57, 463
Goniobasis nebrascensis, M. & H., pl. xxvi, figs. 15 and 16	57, 463
Goniobasis invenusta, M. & H., pl. xxvi, fig. 17	57, 463
Goniobasis sublævis, M. & H., pl. xxvi, fig. 18	57, 463
Limnæa? compactilis, Meek, pl. xxvi, fig. 14	39, 445
Cerithidea? nebrascensis, M. & H., pl. xxvi, fig. 19	57, 463
Micropyrgus minutulus, M. & H., pl. xxvi, fig. 20	59, 465
Campeloma producta, White, pl. xxvi, figs. 21–27	63, 469
Campeloma multilineata, M. & H., pl. xxvii, figs. 1–7	63, 469
Campeloma vetula, M. & H., pl. xxvii, figs. 8 and 9	63, 469
Campeloma multistriata, M. & H., pl. xxvii, fig. 15	63, 469
Viviparus leai, M. & H., pl. xxvii, figs. 10–14	61, 467
Planorbis convolutus, M. & H., pl. xxvii, fig. 16	41, 447
Planorbis (*Bathyomphalus*) *planoconvexus*, M. & H., pl. xxvii, figs. 17 and 18	41, 447
Planorbis (*Bathyomphalus*) *amplexus*, M. & H., pl. xxvii, figs. 19 and 20	41, 447
Planorbis (*Bathyomphalus*) *kanabensis*, M. & H., pl. xxvii, figs. 21–23	41, 447
Valvata? montanaensis, Meek, pl. xxvii, fig. 24	64, 470
Valvata subumbilicata, M. & H., pl. xxvii, fig. 25	64, 470
Hyalina? evansi, M. & H., pl. xxvii, fig. 26	46, 452
Hyalina? occidentalis, M. & H., pl. xxvii, fig. 27	46, 452
Helix? vetusta, M. & H., pl. xxvii, fig. 28	48, 454
Helix evanstonensis, White, pl. xxvii, figs. 29–31	48, 454
Helix sepulta, White	48, 454
Vitrina obliqua, M. & H., pl. xxvii, figs. 32 and 33	46, 452
Goniobasis? subtortuosa, M. & H., pl. xxvii, fig. 34	57, 463
Hydrobia utahensis, White, pl. xxvii, fig. 35	60, 466

	Page.
Hydrobia subconica, Meek, pl. xxvii, fig. 36	59, 465
Hydrobia? eulimoides, Meek, pl. xxvii, fig. 37	59, 465
Hydrobia recta, White, pl. xxvii, fig. 38	60, 466
Hydrobia anthonyi, M. & H., pl. xxvii, fig. 39	59, 465
Hydrobia warrenana, M. & H., pl. xxvii, fig. 40	59, 465

EOCENE.

Unio clinopisthus, White, pl. xxviii, figs. 1 and 2	28, 434
Unio shoshonensis, White, pl. xxviii, fig. 3	29, 435
Unio haydeni, Meek, pl. xxviii, figs. 4 and 5	29, 435
Unio washakiensis, Meek, pl. xxviii, fig. 6–8	29, 435
Unio tellinoides, Hall, pl. xxviii, fig. 9	29, 435
Planorbis (Gyraulus) militaris, White, pl. xxviii, figs. 10 and 11	41, 447
Bythinella gregaria, Meek, pl. xxviii, figs. 12 and 13	60, 466
Bulimus floridanus, Conrad, pl. xxviii, fig 14	48, 454
Melania claibornensis, Heilprin, pl. xxviii, fig. 15	54, 460
Planorbis utahensis, Meek, pl. xxix, figs. 1–3	41, 447
Planorbis utahensis var. *spectabilis*, Meek, pl. xxix, figs. 4–6	41, 447
Planorbis cirratus, White, pl. xxix, fig, 7	42, 448
Planorbis æqualis, White, pl. xxix, figs. 8–10	42, 448
Helix peripheria, White, pl. xvix, figs. 11 and 12	49, 455
Helix riparia, White, pl. xxix, figs. 13 and 14	49, 455
Pupa incolata, White, pl. xxix, figs. 15–17	50, 456
Pupa atavuncula, White, pl. xxix, fig. 18	50, 456
Pupa arenula, White, pl. xxix, fig. 19	50, 456
Limnæa similis, Meek, pl. xxix, figs. 20 and 21	39, 445
Limnæa vetusta, Meek, pl. xxix, figs. 22 and 23	39, 445
Limnæa miniuscula, White, pl. xxix, figs. 24 and 25	40, 446
Succinea (Brachyspira) papillispira, White, pl. xxix, fig. 26	51, 457
Anodonta decurtata, Conrad, pl. xxix, figs. 27 and 28	73, 479
Macrocyclis spatiosa, M. & H., pl. xxx, figs. 1–3	46, 452
Helix? veterna, M. & H., pl. xxx, figs. 4 and 5	48, 454
Physa pleromatis, White, pl. xxx, figs. 6–8	44, 450
Physa bridgeiensis, Meek, pl. xxx, figs. 9 and 10	44, 450
Viviparus paludinæformis, Hall, pl. xxx, figs. 11 and 12	62, 468
Viviparus wyomingensis, Meek, pl. xxx, figs. 13 and 14	62, 468
Goniobasis tenera, Hall, and varieties, pl. xxxi	58, 464

MIOCENE AND PLIOCENE?

Melania sculptilis, Meek, pl. xxxii, fig. 1	55, 461
Melania subsculptilis, Meek, pl. xxxii, fig. 2	55, 461
Melania taylori, Gabb, pl. xxxii, fig. 3	55, 461
Lithasia antiqua, Gabb, pl. xxxii, fig. 4	59, 465
Carinifex (Vorticifex) binneyi, Meek, pl. xxxii, figs. 5 and 6	42, 448
Carinifex (Vorticifex) tryoni, Meek, pl. xxxii, figs. 7–9	42, 448
Ancylus undulatus, Meek, pl. xxxii, fig. 10	45, 451
Sphærium rugosum, Meek, pl. xxxii, figs. 11–13	34, 440
Sphærium idahoense, Meek, pl. xxxii, figs. 14 and 15	34, 440
Planorbis vetustus, M. & H., pl. xxxii, figs. 16–18	42, 448
Planorbis leidyi, M. & H., pl. xxxii, figs. 19–21	42, 448
Planorbis nebrascensis, Evans & Shumard, pl. xxxii, figs. 22 and 23	42, 448
Planorbis lunata, Conrad, pl. xxxii, figs. 24 and 25	42, 448
Limnæa meekii, Evans & Shumard, pl. xxxii, figs. 26 and 27	40, 446
Limnæa shumardi, M. & H., pl. xxii, figs. 28 and 29	40, 446
Limnæa (Polyrhytis) kingii, Meek, pl. xxxii, figs. 30 and 31	40, 446
Helix leidyi, Hall & Meek, pl. xxxii, figs. 32 and 33	49, 455
Helix (Zonites) marginicola, Conrad, pl. xxxii, fig. 34	47, 453
Physa scalina, Evans & Shumard, pl. xxxii, figs. 35 and 36	44, 450
Latia dallii, n. s. White, 1883, pl. xxxii, figs. 37–40	45, 451
Unio meekii, White	28, 434
Unio leai, Meek	28, 434
Viviparus ionicus, White	62, 468

116.

WHITE, C. A. Progress of Invertebrate Paleontology in the United States for the year 1882. <Amer. Nat., vol. xvii, pp. 598-603. Philadelphia, 1883.

Same. Philadelphia, 1883. 8vo, pp. 598-603. One hundred separates printed without title-page, covers, or repaging.

This series of articles, which was begun for the year 1879, was discontinued with this article; but the series is continued by Mr. J. B. Marcou.

117.

WHITE, C. A. Glacial Drift in the Upper Missouri River Region. <Amer. Jour. Sci., 3d ser., vol. xxv, p. 206. New Haven, 1883.

Same. New Haven, 1883. 8vo, p. 206. Twenty separates printed without title-page, covers, or repaging.

The existence of true northern glacial drift in the region of the mouth of the Yellowstone River is announced.

118.

WHITE, C. A. Late observations concerning the Molluscan Fauna and the Geographical extent of the Laramie Group. <Amer. Jour. Sci., 3d ser., vol. xxv, pp. 207–209. New Haven, 1883.

Same. New Haven, 1883. 8vo, pp. 207–209. Twenty separates printed without title-page, covers, or repaging.

The discovery of Laramie fossils in the State of Nuevo Leon, Mexico, and in the Saskatchewan Valley, British America, is announced.

119.

WHITE, C. A. On the existence of a deposit in Northeastern Montana and Northwestern Dakota, that is possibly equivalent with the Green River Group. <Amer. Jour. Sci., 3d ser., vol. xxv, pp 411–416. New Haven, 1883.

Same. New Haven, 1883. 8vo, pp. 411–416. Twenty separates printed without title-page, covers, or repaging.

Some teleost fish remains were obtained from certain layers which rest comformably upon the top of the Laramie Group. On pages 414–416 of this article Prof. E. D. Cope describes a new genus of fishes and two species.

120.

WHITE, C. A. The burning of Lignite in situ. <Amer. Jour. Sci., 3d ser., vol. xxvi, pp. 24–26. New Haven, 1883.

Same. New Haven, 1883. 8vo, pp. 24–26. Twenty separates printed without title-page, covers, or repaging.

The opinion is advanced that the burning of the beds of lignite of the Laramie Group has been mainly the result of spontaneous ignition, and that these fires probably began as early as the later Tertiary and before the advent of man.

121.

WHITE, C. A. On the commingling of ancient faunal and modern floral types in the Laramie Group. <Amer. Journ. Sci., 3d ser., vol. xxvi, pp. 120–123. New Haven, 1883.

Same. New Haven, 1883. 8vo, pp. 120–123. Twenty separates printed without title-page, covers, or repaging.

It is shown that well-known species of Miocene plants are found associated with Dinosaurs and characteristic Laramie mollusks.

122.

WHITE, C. A. [Administrative report for the year 1882–'83.] <Fourth Annual port of the Director of the United States Geological Survey, pp. 42–44. W ington, 1883.

123.

WHITE, C. A. A review of the Fossil Ostreidæ of North America; and a compariso the fossil with the living forms. <Fourth Annual Report of the Director of United States Geological Survey. pp. 281–333, and pls. xxxiv–lxxvi. Washi ton, 1883.

Same. Washington: Government Printing Office, 1883. Imp. 8vo, pp. 281–333, pls. xxxiv–lxxvi. One hundred separates printed with paper covers and ti page, but without repaging.

This work is an annotated catalogue of the species. It contains two appendices, by Prof Heilprin and Mr John A. Ryder, respectively. The former is on the North American Terti *Ostreidæ*. pp. 309–316, and pls. lxii–lxxii. The latter is a sketch of the life-history of the ter. pp. 317–333, and pls. lxxiii–lxxvi.

CARBONIFEROUS.

Pa

Ostrea, Linnæus
O. patercula, Winchell, pl. xxxiv, figs. 1 and 2

JURASSIC.

Ostrea, Linnæus
O. engelmanni, Meek, pl. xxxiv, figs. 3 and 4
O. strigilecula, White, pl. xxxv, figs. 9–11 ... 289
O. (Alectryonia) procumbens, White, pl. xxxv, figs. 6–8
Gryphæa, Lamarck
G. calceola, Quenstedt, var. *nebrascensis*, M. & H., pl. xxxv, figs. 1–5

CRETACEOUS.

Ostrea, Linnæus
O. americana, Deshayes, pl. lvi, figs. 1 and 2, pl. lvii, figs. 1 and 2
O. anomiæformis, Roemer
O. anomioides, Meek, pl. xxxix
O. appressa, Gabb, pl. xxxix, fig. 9 ... 291
O. bella, Conrad, pl. xxxix, fig. 6
O. bellarugosa, Shumard
O. belliplicata, Shumard, pl. lxxviii, figs. 1–3
O. blackii, White, pl. xlv, fig. 1, and pl. xlvi, fig. 2
O. barrandei, Coquand, pl. xliv, figs. 1 and 2, pl. xlv, fig. 2, and pl. xlvi, fig. 1 ... 29
O. breweri, Gabb
O. bryani, Gabb
O. carinata (Lamarck), Roemer, pl. xliii, figs. 1–4
O. coalvillensis, Meek, pl. xxxvi, figs. 1–4
O. confragosa, Conrad
O. congesta, Conrad, pl. xxxix, figs. 11–13
O. convexa, Say, pl. xlviii, figs. 1–5
O. cortex, Conrad, pl. xxxvii, figs. 3 and 4
O. crenulata, Tuomey
O. crenulimargo, Roemer, pl. xliii, figs. 8, 9
O. crenulimarginata, Gabb, pl. xl, fig. 2
O. cretacea, Morton, Owen, pl. xxxix, figs. 1–3 ... 294
O. denticulifera, Conrad
O. diluviana, Linnæus, pl. xl, fig. 1, pl. xli, figs. 1 and 2
O. elegantula, Newberry, pl. xxxvi, figs. 5–7
O. exogyrella, Gabb
O. falcata, Morton, pl. xlii, figs. 2–9
O. franklini, Coquand, pl. xxxix, figs. 1–3
O. gabbanna, M. & H

	Page.
O. inornata, Meek	296
O. idriansis, Gabb, pl. xxxiv, figs. 7 and 8	296
O. (Alectryonia) larva, Lamarck, pl. xlii, figs. 2–9	296
O. lateralis, Nilsson	297
O. littlei, Gabb	297
O. lugubris, Conrad, pl. xli, fig. 3	297
O. lyoni, Shumard	297
O. malleiformis, Gabb, pl. l, fig. 8	297
O. mesenterica, Morton, pl. xlii, figs. 2–9	297
O. mortoni, Gabb	297
O. multilirata, Conrad, pl. xxxviii, figs. 1 and 2	298
O. nasuta, Morton, pl. xlii, figs. 2–9	298
O. owenana, Shumard	298
O. panda, Morton	298
O. pandæformis, Gabb	298
O. patina, M. & H., pl. xlvii, figs. 4–6	298
O. peculiaris, Conrad	298
O. pellucida, M. & H., pl. l, figs. 6 and 7	299
O. planovata, Shumard	299
O. plumosa, Morton, pl. xxxvii, figs. 5 and 6	299
O. prudentia, White, pl. xl, figs. 5 and 6	299
O. quadriplicata, Shumard, pl. xliii, figs. 5–7	299–300
O. robusta, Conrad, pl. xl, figs. 3 and 4	300
O. sannionis, White, pl. xlv, figs. 3–7	300
O. soleniscus, Meek, pl. xlii, fig. 1	300
O. subalata, Meek, pl. xxxix, fig. 10	300
O. subovata, Shumard	301
O. subspatulata, Forbes, pl. xxxvii, figs. 1 and 2	301
O. tecticostata, Gabb, pl. l, figs. 3 and 4	301
O. torosa, Morton	301
O. translucida, M. & H	301
O. tuomeyi, Coquand	301–302
O. uniformis, Meek, pl. xlviii, figs. 6 and 7	302
O. velicata, Conrad	302
O. vomer, Morton, pl. xlviii, figs. 8–10	302
Gryphæa, Lamarck	302
G. mucronata, Gabb	302
G. mutabilis, Morton, pl. xlviii, figs. 1–5	302
G. navia, Conrad	302
G. pitcheri, Morton, pl. xlix, figs. 1–6	302–303
G. thirsæ, Gabb	303
G. vesicularis, Lamarck, pl. xlviii, figs. 1–5	303
G. vomer, Morton	303
Exogyra, Say	303
E. aristina, Roemer, pl. lvi, figs. 3–5	303–304
E. aquila, Goldfuss, pl. liii, figs. 1 and 2	304
E. columbella, Meek, pl. lv, figs. 5 and 6	304
E. costata, Say, pl. lvi, figs. 1 and 2, and pl. lvii, figs. 1 and 2	304
E. fimbriata, Conrad	305
E. forniculata, White, pl. lii, figs. 1 and 2	305
E. fragosa, Conrad	305
E. interrupta, Conrad	305
E. laviuscula, Roemer, pl. lii, figs. 3–5	305–306
E. matheroniana, d'Orbigny	306
E. plicata, Lamarck	306
E. ponderosa, Roemer, pl. l, figs. 1 and 2	306
E. parasitica, Gabb, pl. lv, figs. 3 and 4	306
E. tucana, Roemer, pl. li, figs. 1–5	306
E. walkeri, White, pl. liv, figs. 1 and 2	307
E. winchelli, White, pl. lv, figs. 6 and 7; pl. lvi, figs. 1 and 2	307

LARAMIE GROUP.

Ostrea Linnæus.

O. glabra, M. & H., pls. lviii, lix, lx, lxi	307–308
O. subtrigonalis, Evans & Shumard, pl. lxi, figs. 4–7	308

124.

WHITE, C. A. [Review of] E. O. Ulrich. Description of two new species of Cr (Journ. Cincinnati Soc. Nat. History, vol. v, No. 3, p. 118, pl. v.) <Neues Jal für Mineralogie, Geologie und Paläontologie. 2. Band, p. 118. Stuttgart

125.

WHITE, C. A. [Review of] P. de Loriol. Description of a new species of Bou crinus. (Journ. Cincinnati Soc. Nat. History, vol. v, No. 3, p. 118, pl. v.) < Jahrbuch für Mineralogie, Geologie und Paläontologie. 2. Band, p. 118. gart, 1883.

126.

WHITE, C. A [Review of] S. A. Miller. Description of three new orders an new families in the class Echinodermata, and eight new species from the Si and Devonian formations. (Journ. Cincinnati Soc. Nat. History, vol. v, No 221–231, pl. ix. <Neues Jahrbuch für Mineralogie, Geologie und Paläont 2. Band, p. 117. Stuttgart, 1883.

127.

WHITE, C. A. [Review of] S. A. Miller. Description of three new species a marks upon others. (Journ. Cincinnati Soc. Nat. History, vol. v, No. 3, pp. 11 pl. v.) <Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. 2. p. 98. Stuttgart, 1883.

128.

WHITE, C. A. [Review of] C. Schlumberger. Remarks upon a species of Criste (Journ. Cincinnati Soc. Nat. History, vol. v, No. 3, p. 119, pl. v.) <Neues Jal für Mineralogie, Geologie und Paläontologie. 2. Band, p. 409. Stuttgart,

129.

WHITE, C. A. [Review of] vol. 3, Supplement. Geology. U. S. Geographical S West of the one hundreth Meridian. <Neues Jahrbuch für Mineralogie, G und Paläontologie. 1. Band, pp. 232–233. Stuttgart, 1883.

130.

WHITE, C. A. [Review of] Geology of Wisconsin. Final reports of the Stat logical Survey. 4 volumes, royal 8vo. Published under the direction Chief Geologist by the Commissioners of Public Printing. <Neues Jal für Mineralogie, Geologie und Paläontologie. 2. Band, pp. 341–349. Stu 1883.

131.

WHITE, C. A. [Review of] Clarence E. Dutton, Captain of Ordnance, U. S. The Tertiary History of the Grand Cañon District. 4to, pp. i–xiv and 1–26 i–xlii, with folio atlas containing 23 plates. Washington: Government Pr Office. 1882. <Neues Jahrbuch für Mineralogie, Geologie und Paläont 2. Band, pp. 190–191. Stuttgart, 1883.

132.

WHITE, C. A. [Review of] John Collett. Department of Geology and Natur tory. (Eleventh Annual Report, 1881, Indianapolis, 1882. 8vo, pp. 414, and three small maps.) <Neues Jahrbuch für Mineralogie, Geologie und P tologie. 2. Band, pp. 189–190. Stuttgart, 1883.

133.

WHITE, C. A. [Review of] S. A. Miller. Description of ten new species of fossils. (Journ. Cincinnati Soc. Nat. Hist., vol. v, No. 2, pp. 79–88, pls. iii–iv.) <Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. 2. Band, p. 98. Stuttgart, 1883.

134.

WHITE, C. A. [Review of] S. A. Miller. Description of two new genera and eight new species of fossils from the Hudson River Group, with remarks upon others. (Journ. Cincinnati Soc. Nat. Hist., vol. v, No. 1, pp. 34–44, pls. i and ii.) <Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. 2. Band, pp. 97–98. Stuttgart, 1883.

135.

WHITE, C. A. [Annual report to the director of the National Museum.] <Report of the Assistant Director of the U. S. National Museum, G. Brown Goode, for the year 1882. pp. 31–32. Washington, 1883.

A portion of Dr. White's statements and recommendations are quoted.

136.

WHITE, C. A. On the Macrocheilus of Phillips, Plectostylus of Conrad, and Soleniscus of Meek & Worthen. <Proc. U. S. National Museum, vol. vi, pp. 184–187, pl. viii. Washington, 1884.

Same. Washington: Government Printing Office, 1884, 8vo, pp. 184–187, pl. viii. One hundred and fifty separates printed without title-page, covers, or repaging.

Many of the Carboniferous species which have hitherto been referred by authors to *Macrocheilus* are herein referred to *Soleniscus*.

	Page.
Soleniscus? (*Macrocheilus*) *ponderosus*, Swallow? pl. viii, figs. 1 and 2	187
Soleniscus? (*Macrocheilus*) *primigenius*, Conrad. pl. viii, fig. 3	187
Soleniscus (*Macrocheilus*) *fusiformis*. Hall. pl. viii, figs 4–6	187
Soleniscus (*Macrocheilus*) *newberryi*, Hall, pl. viii, figs. 7 and 8	187
Soleniscus planus, White. pl. viii, figs. 9, 10	187
Soleniscus (*Macrocheilus*) *ventricosus*, Hall, pl. viii, figs. 11 and 12	187
Soleniscus (*Macrocheilus*) *texanus*, Shumard, pl viii, figs. 13 and 14	187
Soleniscus? (*Macrocheilus*) *medialis* M. & W., pl. viii, figs. 15 and 16	187
Soleniscus (*Macrocheilus*) *paludinæformis*, Hall, pl. viii, fig. 17	187
Soleniscus typicus, M. & W., pl. viii, figs. 18 and 19	187

137

WHITE, C. A. On the character and function of the epiglottis in the Bull snake (Pityophis). <Amer. Nat., vol. xviii, pp. 19–21. Philadelphia, 1884.

Same. Philadelphia, 1884, 8vo, pp. 19–21. Fifty separates, printed without title-page, covers, or repaging.

It is shown that the hoarse hiss of this snake is produced by the fluttering of the thin erect epiglottis in the current of air expelled from the rima glottidis.

138.

WHITE, C. A. The permanence of the domestic instinct in the cat. <Amer. Nat., vol. xviii, pp. 213–214. Philadelphia, 1884.

Same. Philadelphia, 1884, 8vo, pp. 213–214. Fifty separates printed without title-page, covers, or repaging.

A story of a cat which had spent a year alone in the wilderness of the Upper Missouri.

139.

WHITE, C. A. Glacial drift in Montana and Dakota. <Amer. Jour. Sci. 3d ser., vol. xxvii, pp. 112–113. New Haven, 1884.

Same. New Haven, 1884, 8vo 3d ser., vol. xxvii, pp. 112–113. Twenty separates printed without title-page, covers, or repaging.

The presence of true northern glacial drift is observed along the Upper Missouri River, from the Great Falls to Bismarck.

140.

WHITE, C. A. Description of certain aberrant forms of the Chamidæ from the Cretaceous rocks of Texas. <Bull. of the U. S. Geol. Surv. No. 4. On Mesozoic fossils. pp. 5 (93)–9 (94), pls. i–v. Washington, 1884.

	Page
Requienia, Matheron	6
R. patagiata, n. s., White, 1884, pl. i, figs. 1–8, and pl. ii, figs. 1–4	6-7
R. texana, Rœmer, 1852, pl. ii, figs. 5–7	7
Monopleura, Matheron	8
M. marcida, n. s., White, 1884, pls. iii and iv	8
M. pinguiscula, n. s., White, 1884, pl. v	8-9

141.

WHITE, C. A. On a small collection of Mesozoic fossils, obtained in Alaska by Mr. W. H. Dall, of the United States Coast Survey. <Bull. of the U. S. Geol. Surv. No. 4. On Mesozoic fossils. pp. 10 (98)–15 (103), pl. vi. Washington, 1884.

	Page.
Mollusca.	
Aucella, Keyserling	13
A. concentrica, Fischer var. White, 1884, pl. vi, figs. 2–12	13-14
Cyprina, Lamarck	14
C.? dallii, n. s., White, 1884, pl. vi, fig. 1	14
Belemnites, Lamarck	14
B. macritatis, n. s., White, 1884, pl. vi, figs. 13–14	14-15

142.

WHITE, C. A. On the Nautiloid genus Enclimatoceras Hyatt, and a description of the type species. <Bull. of the U. S. Geol. Surv. No. 4. On Mesozoic fossils. pp. 16 (104)–17 (105), pls. vii–ix. Washington, 1884.

	Page.
Enclimatoceras, n. g., Hyatt, 1884	16-17
E. (Nautilus) ulrichi, n. s., White, 1884, pls. vii, viii, and ix	17

143.

WHITE, C. A. On the adaptability of the prairies for artificial forestry. <Science, 4°, vol. iii, pp. 438–443. Cambridge, 1884.

The view is held that the prairie soil is well adapted to the growth of forest trees; and that the prairies are such only because their occupation by forests has not been accomplished by the natural distribution of trees; also that such distribution has long been retarded by prairie fires.

144.

WHITE, C. A. Enemies and parasites of the oyster, past and present. <Science, 4to, vol. iii, p. 618. Cambridge, 1884.

It is shown that *Cliona* or a similar burrowing sponge infested certain *Brachiopod* shells as early as the Devonian, and that they were as common upon the fossil *Ostreidæ* as upon the living. Also that remains of star fishes are rarely found with fossil *Ostreidæ*, although they are so common an enemy to living oysters.

145.

E, C. A. Certain phases in the geological history of the North American Continent, biologically considered. <Proceedings of the Washington Biological Society. vol. ii, pp. 41–66. Washington, 1884.

. One hundred separates printed with paper covers, title-page, and repaging.

Address as retiring president of the Biological Society of Washington.

146.

E, C. A. Fossils of the Indiana rocks, No. 3. <Indiana, Department of Geology and Natural History. Thirteenth annual report, John Collett, State geologist. pp. 105–180, pls. xxiii–xxix. Indianapolis, 1884.

This paper contains some elementary remarks and description of three new species, but it is mainly devoted to the republication of well-known forms.

. Indianapolis, 1884, pp. —. Fifteen separates printed.

FAUNA OF THE COAL-MEASURES.

Description of species.

	Page.
Protozoa.	
Foraminifera.	
Fusulina, Fischer	116
F. cylindrica, Fischer, pl. xxiii, figs. 1–3	116–117
Cœlenterata.	
Polypi.	
Zaphrentis, Rafinesque	117
Z. gibsoni, n. s., White, 1884, pl. xxiii, figs. 4 and 5	117–118
Lophophyllum, Edwards & Haime	118
L. proliferum, McChesney, pl. xxiii, figs. 6 and 7	118
Axophyllum, Edwards & Haime	118
A. rudis, White & St. John, 1867, pl. xxiii, figs. 8 and 9	118–119
Campophyllum, Edwards & Haime	119
C. torquim, Owen, 1852, pl. xxiii, figs. 10–13	119
Michelinia, de Koninck	119
M. eugeneæ, n. s., White, 1884, pl. xxiii, figs. 14–16	119–120
Brachiopoda.	
Lingula, Bruguière	120
L. umbonata, Cox, 1857, pl. xxv, fig. 14	120
Discina, Lamarck	121
D. nitida, Phillips, pl. xxv, fig. 10	121
D. convexa, Shumard, 1858, pl. xxv, fig. 9	121
Crania, Retzius	121
C. modesta, White & St. John, 1867, pl. xxxv, fig. 9, and pl. xxxvi, fig. 5	121–122
Productus, Sowerby	122
P. nebrascensis, Owen, 1852, pl. xxiv, figs. 7–9	122–123
P. symmetricus, McChesney, 1866, pl. xxv, figs. 1 and 2	123
P. punctatus, Martin, pl. xxvii, figs. 1–3	124
P. costatus, Sowerby, pl. xxiv, figs. 4–6, and pl. xxv, figs. 3–5	124–125
P. semireticulatus, Martin, pl. xxiv, figs. 1–3	125–126
P. cora, d'Orbigny pl. xxvi, figs. 1–3	126–127
P. longispinus, Sowerby, pl. xxiv, figs. 10 and 11	127–128
Chonetes, Fischer	128
C. verneuiliana, Norwood & Pratten, 1854, pl. xxv, figs. 7 and 8	128
Orthis, Dalman	129
O. pecosi, Marcou, 1858, pl. xxxii, figs. 20–22	129
Hemipronites, Pander	129
Streptorhynchus, King	129
Hemipronites crassus, M. & H., pl. xxvi, figs. 4–11	129–130
Meekella, White & St. John	130
M. striatocostata, Cox, 1857, pl. xxvi, figs. 12–14	130–131
Syntrielasma, M. & W	131
S. hemiplicata, Hall, 1852, pl. xxvi, figs. 15–18	131–132
Rhynchonella, Fischer	132
R. uta, Marcou, 1858, pl. xxv, fig. 6	132

1

Spirifer, Sowerby

S. cameratus, Morton, 1836, pl. xxxv, figs. 3–5 11

S. (Martinia) lineatus, Martin, pl. xxvii, figs. 4–6 11

S. (Martinia) planoconvexa, Shumard, 1855, pl. xxxii, figs. 23 and 24 11

Spiriferina, d'Orbigny

S. kentuckensis, Shumard, 1855, pl. xxxv, figs. 13 and 14

Athyris, McCoy

A. subtilita, Hall, pl. xxxv, figs. 6–8

Retzia, King

R. mormonii, Marcou, 1856, pl. xxxv, figs. 10–12 13

Terebratula, Llhwyd

T. bovidens, Morton, 1836, pl. xxxii, figs. 17–19

Polyzoa.

Symocladia, King

S. biserialis, Swallow, 1858, pl. xxv, figs. 11–13

Conchifera.

Lima, Bruguière

L. retifera, Shumard, 1858, pl. xxviii, fig. 4 13

Monopteria, M. & W

M. gibbosa, M. & W., 1866, pl. xxx, figs. 11 and 12

Myalina, de Koninck

M. subquadrata, Shumard, 1855, pl. xxix, figs. 1 and 2, and pl. xxx, figs. 1 and 2

M. recurvirostris, M. & W., 1866, pl. xxix, figs. 3 and 4 14

M.? swallovi, McChesney, 1860, pl. xxx, figs. 6–8

Entolium, Meek

E. aviculatum, Swallow, 1858, pl. xxviii, figs. 7 and 8

Eumicrotis, Meek

E. hawni, M. & H., 1866, pl. xxx, fig. 10 14

Aviculopecten, McCoy

A. occidentalis, Shumard, 1855, pl. xxviii, fig. 8

A. carboniferus, Stevens, 1858, pl. xxviii, figs. 5 and 6

A.? interlineatus, M. & W., pl. xxx, fig. 9

Pinna, Linnæus

P. peracuta, Shumard, 1858, pl. xxviii, figs. 1 and 2 14

Nuculana, Link

N. bellistriata, Stevens, 1858, pl. xxxi, figs. 8 and 9

Nucula, Lamarck

N. ventricosa, Hall, 1858, pl. xxvii, figs. 9 and 10 14

Schizodus, King

S. wheeleri, Swallow, 1862, pl. xxx, figs. 3–5

Olinopistha, M. & W

O. radiata, Hall, 1858, pl. xxxi, figs. 6 and 7 14

Edmondia, de Koninck

E. aspinwallensis, Meek, 1872, pl. xxxi, figs. 4 and 5

Allorisma, King

A. subcuneata, M. & H., 1864, pl. xxxi, figs. 1–3 14

Gasteropoda.

The genera Macrocheilus and Soleniscus 14

Soleniscus, M. & W

S. typicus, M. & W., 1866, pl. xxxiv, figs. 18, 19

S. (Macrocheilus) newberryi, Stevens, 1858, pl. xxxiv, figs. 7 and 8

S. planus, White, 1881, pl. xxxiv, figs. 9 and 10 15

S. (Macrocheilus) fusiformis, Hall, 1858, pl. xxxiv, figs. 4–6

S. (Macrocheilus) paludinæformis, Hall, 1858, pl. xxxiv, fig. 17 15

S. (Macrocheilus) ventricosus, Hall, 1858, pl. xxxiv, figs. 11 and 12

S. (Macrocheilus) texanus, Shumard? 1859, pl. xxxiv, figs. 13 and 14 15

S. (Macrocheilus) medialis, M. & W., 1866, pl. xxxiv, figs. 15 and 16

S. (Macrocheilus) ponderosus, Swallow?, 1858, pl. xxxiv, figs. 1 and 2

S. (Macrocheilus) primigenius, Conrad, 1835, pl. xxxiv, fig. 3

Bellerophon, Montfort

B. crassus, M. & W., 1866, pl. xxxiii, figs. 1 and 2

B. percarinatus, Conrad, 1842, pl. xxxiii, figs. 9–14

B. carbonarius, Cox, 1857, pl. xxxiii, figs. 6–8 15

B. nodocarinatus, Hall, 1858, pl. xxxiii, figs. 3–5

Platyceras, Conrad

Page.
P. nebrascense, Meek, 1872, pl. xxxii, figs. 15 and 16 159–160
Pleurotomaria, Defrance 160
P. turbiniformis, M. & W., 1866, pl. xxxii, figs. 7 and 8 160
P. tabulata, Hall, pl. xxxii, figs. 4 and 5 160–161
P. sphærulata, Conrad, 1842, pl. xxxii, figs. 1–3 161
Euomphalus, Sowerby 161
E. rugosus, Hall, 1858, pl. xxxii, figs. 11 and 12 161–162
Naticopsis, McCoy 162
N. nana, M. & W., 1866, pl. xxxvi, figs. 6 and 7 162
N. wheeleri, Swallow, 1860, pl. xxxii, figs. 13 and 14 162–163
Polyphemopsis, Portlock 163
P. peracuta, M. & W., pl. xxxii, figs. 9 and 10 163
P. nitidula, M. & W., 1866, pl. xxvii, figs. 7 and 8 163
Polyphemopsis? —— (?) White, 1884, pl. xxxii, fig. 6 164
Cephalopoda.
Orthoceras, Breynius 164
O. rushensis, McChesney, pl. xxxvi, fig. 5 164
Nautilus, Breynius 165
N. winslowi, M. & W., 1873, pl. xxxvi, figs. 1 and 2 165
N. forbesianus, McChesney, pl. xxxvi, figs. 3 and 4 165
N. missouriensis, Swallow? 1857, pl. xxxv, figs. 1 and 2 166
Crustacea.
Gnathostomata.
Leaia, Jones 167
L. tricarinata, M. & W., 1868, pl. xxxix, figs. 10–13 167–168
Merostomata.
Eurypterus, DeKay 168
E. (Anthraconectes) mazonensis, M. & W., 1868, pl. xxxvii, figs. 1–3 168–170
Euproops, M. & W 170
E. danæ, M. & W., 1866, pl. xxxix, fig. 1 170–172
E. colletti, n. s., White, 1884, pl. xxxix, fig. 2 172
Trilobita.
Phillipsia, Portlock 173
P. (Griffithides?) scitula, M. & W., 1873, pl. xxxix, figs. 6–9 173–174
P. (Griffithides?) sangamonensis, M. & W., 1873, pl. xxxix, figs. 4 and 5 174–176
Isopoda.
Acanthotelson, M. & W 176
A. stimpsoni, M. & W., 1866, pl. xxxvii, figs. 4 and 5 176–177
A. eveni, M. & W., 1868, pl. xxxviii, figs. 4–7 177–178
Dithyrocaris, Scouler 178
D. carbonarius, M. & W., 1873, pl. xxxix, fig. 3 178
Macroura.
Palæocaris, M. & W 179
P. typus, M. & W., pl. xxxviii, figs. 1–3 179–180
Anthrapalæmon, Salter 180
A. gracilis, M. & W., 1865, pl. xxxviii, figs. 8 and 9 180

147.

ITE, C. A. [Review of] Geological Survey of Illinois; A. H. Worthen, Director. Vol. vii, Geology and Paleontology. Springfield. 1883. pp. 1–373; pls. i–xxxi. <Science. 4to. Vol. iii, pp. 332–333. Cambridge, 1884.

148.

ITE, C. A. Notes on the Jurassic strata of North America. <Amer. Jour. Sci. 3d ser., vol. xxix, pp. 228–232. New Haven, 1885.

A criticism of the views published by Mr. J. F. Whiteaves in Geol. Surv. Canada, Mesozoic Fossils, vol. 1, part ii. Montreal, 1884. The identification of the following species is considered very doubtful:

Page.
Belemnites densus, M. & H 229
Lyosoma Powelli, White 230
Myacites (Pleuromya) subcompressa, Meek 230

	Page.
Astarte Packardi, White	220
Arca (Cucullæa) inornata, M. & H	220
Modiola (Volsella) subimbricata, M. & H	220
Pteria (Oxytoma) mucronata, M. & H	220
Camptonectes extenuatus, M. & H	220-221
Gryphæa nebrascensis, M. & H	221

149.

WHITE, C. A. The Genus Pyrgulifera, Meek, and its Associates and Congeners. <Amer. Jour. Sci., 3d ser., vol. xxix, pp. 277–280. New Haven, 1885.

A summary of the occurrence, fossil and recent, of the genus *Pyrgulifera*.

150.

WHITE, C. A. On Marine Eocene, Fresh-water Miocene, and other Fossil Mollusca of Western North America. <Bull. U. S. Geol. Surv., No. 18, pp. 1–19, pls. i–iii. Washington, 1885.

This paper is divided into three parts, the first on "The occurrence of *Cardita planicosta*, Lamarck, in Western Oregon," pl. i, pp. 7–9.

The second on "Fossil Mollusca, from the John Day group in Eastern Oregon," pp. 10–14.

The following new species are described:

	Page.
Unio condoni, n. s., White, 1885, pl. ii, figs. 1–3	12-14
Helicidæ	14
Helix (Aglaia) fidelis, Gray, pl. iii, figs. 1–3	14
Helix (Patula) perspectiva, Say, pl. iii, fig. 7	14
Helix (Monodon?) dallii, Stearns, MS., 1885, pl. iii, figs. 4–6	14-15
Gonostoma yatesii, Cooper, pl. iii, figs. 8–12	15

The third part contains "Supplementary notes on the non-marine fossil mollusca of North America.

	Page.
Ampullaria polveli	15
Cerithidea nebrascensis	15
Dreissena leucopheata	15
Physa prisca	16
Unio martini	16
Zaptychius carbonaria	16

151.

WHITE, C. A. On new Cretaceous Fossils from California. <Bull. U. S. Geol. Surv., No. 22, pp. 1 (349);–15 (361), pls. i–v. Washington, 1885.

	Page.
Chamidæ.	
Coralliochama, n. g., White, 1885	9-10
C. orcutti, n. s., White, 1885, pls. i–iv	10-12
Trochidæ.	
Trochus, Linnæus	12
Subgenus *Oxystele*, Philippi	12
T. (Oxystele) euryostomus, n. s., White, 1885, pl. v, figs. 9–11	12
Neritidæ.	
Nerita, Linnæus	12
Nerita, ——? White, 1885	13
Cerithiidæ.	
Cerithium, Bruguière	13
C. pillingi, n. s., White, 1885, pl. v, figs. 3–6	13
C. totium sanctorum, n. s., White, 1885, pl. v, figs. 12 and 13	13
Solariidæ.	
Solarium, Lamarck	14
S. wallalense, n. s., White, 1885, pl. v, figs. 1 and 2	14

Besides the foregoing, Dr. White has in press an important work on the Cretaceous invertebrates of Brazil, which were collected by the Imperial Geological Commission under the direction of the late Prof. Ch. Fred. Hartt. The work is in process of publication at Rio de Janeiro by the Brazilian National Museum. It is to appear in Volume VII of the "Archives" of that museum, in both the Portuguese and English languages, and will be illustrated with 28 lithographic plates of figures.

The work consists of five parts, which are as follows in the original Portuguese edition—

Contribuiçœs para a Palæontologia do Brazil:

No. 1. Conchiferos Cretaceos.
No. 2. Gasteropodes Cretaceos.
No. 3. Cephalopodes Cretaceos.
No. 4. Molluscos Cretaceos de Agua doce do Grupo da Bahia.
No. 5. Echinodermes Cretaceos.

Two hundred and fourteen species in all are published and figured in this work, of which 116 species are diagnosed as new. Four new genera are proposed, three of gasteropoda and one of echinoids. The former are *Orvillia*, *Cylindritella*, and *Cyprœactœon*. The latter is *Heteropoda*, the generic diagnosis of which was furnished to the author by Prof. P. de Loriol, of Geneva.

PART III.

PUBLISHED WRITINGS OF CHARLES DOOLITTLE WALCOTT.

III.—PUBLISHED WRITINGS OF CHARLES DOOLITTLE WALCOTT.

1.

WALCOTT, C. D. Description of a New Species of Trilobite. <Cincinnati Quarterly Journal of Science, vol. ii, pp. 273–274, figs. 18 *a*, *b*. July. Cincinnati, 1875.

	Page.
Spherocoryphe, Angelin.	
S. robustus, n. s., Walcott, 1875, p. 274, figs. 18 *a*, *b*	273–274

2.

WALCOTT, C. D. New Species of Trilobite from the Trenton Limestone at Trenton Falls, N. Y. <Cincinnati Quarterly Journal of Science, vol. ii, pp. 347–349, fig. 27. October. Cincinnati, 1875.

	Page.
Remopleurides, Portlock.	
R. striatulus, n. s., Walcott, 1875, fig. 27 *a*, *b*, and *A*	347–349

3.

WALCOTT, C. D. Notes on Ceraurus pleurexanthemus, Green. <Annals Lyc. Nat. Hist. N. Y., vol. xi, pp. 155–162, pl. xi. November. New York, 1875.

4.

WALCOTT, C. D. Preliminary Notice of the Discovery of the Remains of the Natatory and Branchial appendages of Trilobites. <28th Regent's Report N. Y. State Mus. Nat. Hist., pp. 89–92. 1877. Albany, 1879.

5.

WALCOTT, C. D. Descriptions of New Species of Fossils from the Trenton limestone. <28th Regent's Report N. Y. State Mus. Nat. Hist., pp. 93–97. 1877. Albany, 1879.

	Page.
Conularia, Miller, MS., 1818	93
C. quadrata, n. s., Walcott, 1877	93
**Conchopeltis*, n. g., Walcott, 1877	93
C. alternata, n. s., Walcott, 1877	93–94
C. minnesotensis, n. s., Walcott, 1877	94
Bathyurus, Billings	94
B. longispinus, n. s., Walcott, 1877	94–96
Asaphus, Brongniart, 1822	96
A. romingeri, n. s., Walcott, 1877	96–97
A. wisconsensis, n. s., Walcott, 1877	97

6.

WALCOTT, C. D. Notes on some Sections of Trilobites from the Trenton limestone, [and] Note upon the Legs of Trilobites. <31st Regent's Report N. Y. State Mus. Nat. Hist., pp. 61–65, pl. i. Albany, 1879.

Published in advance, September 20, 1877, pp. 1–17, pl. i.
Extracts from the 31st Regent's report, published in March, 1879.

---

* κογχη, shell; πελτη, shield.

7.

WALCOTT, C. D. Note upon the Eggs of the Trilobite. <31st Regent's Report N. Y. State Mus. Nat. Hist., pp. 66–67? Albany, 1879.

Published in advance, September 20, 1877, pp. 11–12.
Extracts from the 31st Regent's report, published in March, 1879.

8.

WALCOTT, C. D. Descriptions of New Species of Fossils from the Chazy and Trenton limestones. <31st Regent's Report N. Y. State Mus. Nat. Hist., pp. 68–71. Albany, 1879.

Published in advance, September 20, 1877, pp. 15–21.
Extract from the 31st Regent's report, published in March, 1879.

	Page.
Arionellus, Barrande, 1846	15, 68
A. pustulatus, n. s., Walcott, 1877	15, 68
Cerauurus, Green, 1832	15, 68
C. rarus, n. s., Walcott, 1877	15–16, 68
Encrinurus, Emmerich, 1845	16, 68
E. trentonensis, n. s., Walcott, 1877	16, 68
E. curiosatatus, n. s., Walcott, 1877	16, 68
Acidaspis, Murchison, 1839	16, 68
A. parvula, n. s., Walcott, 1877	16, 17, 68
Dalmanites, Barrande, 1839	17, 68
D. intermedius, n. s., Walcott, 1877	17–18, 68–70
Illaenus, Dalman, 1839	18, 70
I. indeterminatus, n. s., Walcott, 1877	19–20, 70–71
I. milleri, Billings	20, 71
Asaphus, Brongniart, 1822	20, 71
A. homalonotoides, n. s., Walcott, 1877	20–21, 71

9.

WALCOTT, C. D. Descriptions of New Species of Fossils from the Calciferous formation. <32d Regent's Report N. Y. State Mus. Nat. Hist., pp. —. Albany.

Published in advance, January 3, 1879, pp. 1–4.

	Page.
Platyceras, Conrad, 1840	1
P. minutissimum, n. s., Walcott, 1879	1
Metoptoma, Phillips., 1836	1
M. cornutaforme, n. s., Walcott, 1879	1
Conocephalites, Adams, 1843	1
C. calciferus, n. s., Walcott, 1879	1, 2
C. hartii, n. s., Walcott, 1879	2, 3
Ptychaspis, Hall, 1863	3
P. speciosus, n. s., Walcott, 1879	3
Bathyurus armatus, Billings	3, 4

10.

WALCOTT, C. D. The Utica slate and Related formations. Fossils of the Utica slate and Metamorphoses of Triarthrus Becki. <Trans. Albany Institute, vol. x, pp. 1–38, pls. i–ii. Albany, 1879.

Published in advance, June, 1879.

	Page.
**Cyathophycus*, n. g., Walcott, 1879	18
C. reticulatus, n. s., Walcott, 1879, pl. ii, figs. 16, 16 *a–d*	19
C. subspherieus, n. s., Walcott, 1879, pl. ii. fig. 17	19
†Discophycus, n. g., Walcott, 1879	19
D. typicalis, n. s., Walcott, 1879, pl. ii, figs. 18, 18*a*	19

* Κύαθος, a cup; φῦκος, a weed. † Δίσκος, a disk; φῦκος, a sea-weed.

	Page.
Graptolithus, Linnæus, 1736	20
G. annectans, n. s., Walcott, 1879	20
Dendrograptus, Hall, 1865	20
D. simplex, n. s., Walcott, 1879, pl. i, figs. 5, 5 *a*, *b*, and 6	20
D. tenuiramosus, n. s., Walcott, 1879, pl. i, fig. 4	21
D. compactus, n. s., Walcott, 1879, pl. i, fig. 1	21
Sagenella, Hall, 1852	22
S. ambigua, n. s., Walcott, 1879, pl. i, figs. 3, 3 *a*	22
Modiolopsis, Hall, 1847	22
M. cancellata, n. s., Walcott, 1879, pl. i, figs. 8, 8 *a*	22
Orthoceras, Breynius, 1732	22
O. oneidaense, n. s., Walcott, 1879, pl. i, figs. 7, 7 *a*	22–23
Bayrichia cincinnatiensis, Miller	23
Triarthrus becki, Green, 1832	23–24
Metamorphoses of *Triarthrus becki*	24–26
Degree of development	26–29
Periods of development	29–30
Comparison of parts during development	30–31
Table of development	31–32
Ornamentation	32–33
Catalogue of fossils occurring in the Utica slate	34–38

11.

WALCOTT, C. D. The Permian and other Paleozoic Groups of the Kanab Valley, Arizona. <Amer. Jour. Sci., 3d ser., vol. xx, pp. 221–225. September. New Haven, 1880.

12.

WALCOTT, C. D. The Trilobite: New and Old Evidence Relating to its Organization, <Bull. Mus. Comp. Zool., at Harvard College, vol. viii, No. 10, pp. 191–224, pls. i–vi. March. Cambridge, 1881.

13.

WALCOTT, C. D. On the nature of Cyathophycus. <Amer. Jour. Sci., 3d ser., vol. xxii, pp. 394–395. November. New Haven, 1881.

14.

WALCOTT, C. D. Description of a New Genus of the The Order Euripterida from the Utica slate. <Amer. Jour. Sci., 3d ser., vol. xxiii, pp. 213–216. March. New Haven, 1882.

	Page.
Echinognathus, n. g., Walcott, 1882.	
E. clevelandi, n. s., Walcott, fig. 1, p. 213; fig. 2, p. 214	213–216

15.

WALCOTT, C. D. Injury sustained by the Eye of a Trilobite at the time of Moulting of the shell. <Amer. Jour. Sci., 3d ser., vol. xxvi, p. 302. October. New Haven, 1883.

16.

WALCOTT, C. D. Descriptions of new species of Fossils from the Trenton group of New York. <35th Regents Rep., N. Y. State Mus. Nat. Hist., pp. 207–214, pl. xvii. Albany, 1884.

Published in advance. October 15, 1883, pp. 1–8, pl. xvii.

	Page.
Glyptocrinus, Hall	1, 207
G. argutus, n. s., Walcott, 1883, pl. xvii, fig. 9	1, 207
G.? subnodosus, n. s., Walcott, 1883, pl. xvii, fig. 3	2, 208
Merocrinus, n. g., Walcott, 1883	2–3, 208–209
M. typus, n. s., Walcott, 1883, pl. xvii, fig. 5	3, 209

Page.
M. corroboratus, n. s., Walcott, 1883, pl. xvii, fig. 6 ..... 4, 210
Icarinus, Hall 4, 210
I. trentonensis, n. s., Walcott, 1883, pl. xvii, figs. 7, 8 ..... 4–5, 210–211
Dendrocrinius, Hall 5, 211
D. retractilis, n. s., Walcott, 1883, pl. xvii, fig. 4 ..... 5, 211
Calceocrinus, Hall 6, 212
C. barrandii, n. s., Walcott, 1883, pl. xvii, figs. 1, 2 ..... 6, 212
Metoptoma, Phillips 6, 212
M. billingsi, n. s., Walcott, 1883, pl. xvii, figs. 12, 12 a 6–7, 212–213
Beyrichia, McCoy 7, 213
B. bella, n. s., Walcott, 1883, pl. xvii, figs. 11, 11 a 7, 213
Leperditia, Rouault 7, 213
Subgenus *Isochilina*, Jones 7, 213
S. (Isochilina) armata, n. s., Walcott, 1883, pl. xvii, fig. 10 ..... 7–8, 213–214

17.

WALCOTT, C. D. Cambrian system of the United States and Canada. <Bull. Philosophical Soc., Washington, vol. vi, pp. 97–102. Washington. 1884.

Separates were published in [December, 1883].

18.

WALCOTT, C. D. Pre-carboniferous strata in the Grand Cañon of the Colorado, Arizona. <Amer. Jour. Sci., 3d ser., vol. xxvi, pp. 437–442, and p. 484. December. New Haven, 1883.

19.

WALCOTT, C. D. Fresh-water shells from the Paleozoic Rocks of Nevada. <Science, vol. ii, pp. 808–809. December. Cambridge, 1883.

Page.
Zaptychius, n. g., Walcott, 1883 808
Zaptychius carbonaria, n. s, Walcott, 1883, fig. 1 808
Physa prisca, n. s., Walcott, 1883, fig. 2 809
Ampullaria powelli, n. s., Walcott, 1883, fig. 3 809

20.

WALCOTT, C. D. Appendages of the Trilobite. Notes on the original specimen described by Prof. Mickleborough (Journ. Cincinnati Soc. Nat. Hist., vol. vi, p. 200, 1883). <Science, vol. iii, pp. 279–281, figs. 3. March. Cambridge, 1884.

21.

WALCOTT, C. D. Note on Paleozoic Rocks of Central Texas. <Amer. Jour. Sci., 3d ser., vol. xxvii, pp. 431–433. December. New Haven, 1884.

22.

WALCOTT, C. D. Deer Creek Coal-field, White Mountain Indian Reservation, Arizona. Report and Appendix. <U. S. Senate Ex. Doc. No. 20, 48th Congress, 2d session, pp. 1–7. December. Washington, 1884.

23.

WALCOTT, C. D. Paleontology of the Eureka District. <Monograph viii, U. S. Geol. Surv., pp. i–xiii, 1–298, pls. i–xxiv, figs. 1–7 in text. Washington, 1884.

CONTENTS.

Page.
Letter of transmittal to Mr. Arnold Hague, by the author v
Letter of transmittal to the director, by Mr. Arnold Hague vii
Preface ix

Page.
Summary of results 1–9
Fossils of the Cambrian 11–64
Observations on *Olenellus howelli* 32–39
Fossils of the Lower Silurian 65–98
Fossils of the Devonian 99–211
Fossils of the Carboniferous 212–267
Systematic list of species 268–281
Paleozoic section in Central Nevada 283–285
Index 287–296

FOSSILS OF THE CAMBRIAN.

Prospect Mountain Group.

Porifera.
Protaspongia, Salter 11
P. fenestrata, Salter, 1864, pl. ix, figs. 5, 5 *a*, *b* 11–12
Brachiopoda.
Lingulepis, Hall 12
L. mæra, H. &W., 1877 12–13
L.? minuta, H. & W., 1877 13
Lingula, Bruguière 13
L.? manticula, White, 1874, pl. ix, figs. 3 and pl. xi, fig. 2 13–14
Obolella, Billings 14
O. discoidea, H. &W., 1877 14
Acrothele, Linnarsson 14
A.? dichotoma, n. s., Walcott, 1884, pl. ix, fig. 11 14–15
Scenella, Billings 15
S.? conula, n. s., Walcott, 1884, pl. ix, fig. 6 15–16
Acrotreta, Kutorga 16–17
A. gemma, Billings, 1865, pl. i, figs. 1 *a*, 1 *b*, 1 *d–f*; pl. ix, figs. 9, 9 *a* 17–18
Kutorgina, Billings 18
K. whitfieldi, n. s., Walcott, 1884, pl. ix, figs. 4, 4 *a* 18–19
K. prospectensis, n. s., Walcott, 1884, pl. ix, figs. 1 *a*, *b* 19
K. sculptilis, Meek sp., 1873, pl. i, figs. 7, 7 *a*, *b*; pl. ix, fig. 7 20–21
Leptæna, Dalman 22
L. melita, H. & W., 1877 22
Orthis, Dalman 22
O. eurekensis, n. s., Walcott, 1884, pl. ix, figs. 8, 8 *a* 22–23
Pteropoda.
Stenotheca, Salter 23
S. elongata, n. s., Walcott, 1884, pl. ix, figs. 2, 2 *a* 23
Hyolithes, Eichwald 23
H. primordialis, Hall sp., 1861 23–24
Pœcilopoda.
Agnostus, Brongniart 24
A. richmondensis, n. s., Walcott, 1884, pl. ix, fig. 10 24–25
A. seclusus, n. s., Walcott, 1884, pl. ix, fig. 14 25
A. bidens, Meek, 1873, pl. ix, figs. 13, 13 *a* 26, 27
A. communis, H. & W., 1877 27
A. neon, H. & W., 1877 27
A. prolongus, H. & W., 1877 28
Olenellus, Hall 28
O. iddingsi, n. s., Walcott, 1884, pl. ix, fig. 12 28
O. gilberti, Meek, MSS., 1874, pl. ix, figs. 16, 16 *a*; pl. xxi, fig. 13 29
O. howelli, Meek, MSS., 1874, pl. ix, figs. 15, 15 *a*, *b*, and pl. xxi, figs. 1–9 30–31
Observations on *Olenellus howelli*, pl. xxi, figs. 1–7 32–39
Dicellocephalus, Owen 40
D. bilobatus, H. & W., 1877 40
D. osceola, Hall, 1863, pl. ix, fig. 25 40
D. nasutus, n. s., Walcott, 1884, pl. x, fig. 15 40–41
D. richmondensis, n. s., Walcott, 1884, pl. x, fig. 7 41–42
D.? angustifrons [illegible] 1884, pl. x, figs. 1, 1 *a*, *b* 42–43
[illegible] n. s., [illegible] fig. 19 43–44
[illegible] [illegible], fig. 13 44–45
[illegible] ix, fig. 24 45

	Page.
D.? expansus, n. s., Walcott, 1884, pl. ix, fig. 19	45–46
Ptychoparia, Corda	46
P.? prospectensis, n. s., Walcott, 1884, pl. ix, fig. 20	46–47
P.? linnarssoni, n. s., Walcott, 1884, pl. ix, figs. 18, 18 *a*	47–48
P. (Solenopleura?) breviceps, n. s., Walcott, 1884, pl. x, fig. 9	49
P.? pernasutus, n. s., Walcott, 1884, pl. x, figs. 8, 8 *a*, *b*	49–50
P. (Euloma?) dissimilis, n. s., Walcott, 1884, pl. ix, fig. 28	51
P. occidentalis, n. s., Walcott, 1884, pl. x, fig. 5	51–52
P. similis, n. s., Walcott, 1884, pl. x, fig. 10	52–53
P. similis var. *robustus*, n. var., Walcott, 1884, pl. i, figs. 9, 9 *a*	53
P. (Euloma?) affinis, n. s., Walcott, 1884, pl. x, fig. 12	54
P. læviceps, n. s., Walcott, 1884, pl. x, figs. 17, 18	54–55
P. oweni, M. & H., 1861, pl. x, figs. 3, 3 *a*	55–56
P. anytus, H. & W., 1877, pl. ix, fig. 26	56
P. granulosus, H. & W., 1877	57
P. haguei, H. & W., 1877	57
P. nitidus, H. & W., 1877	57–58
P. unisulcatus, H. & W., 1877	58
Subgenus *Pterocephalus*, Rœmer	58
P. (Pterocephalus) occidens, n. s., Walcott, 1884, pl. ix, fig. 21	58–59
P. (Pterocephalus) laticeps, H. & W., 1877	59
Anomocare, Angelin	59
A.? parvum, n. s., Walcott, 1884, pl. ix, fig. 17	59–60
Ptychaspis, Hall	60
P. minuta, Whitfield? 1878, pl. x, fig. 23	60–61
Chariocephalus, Hall	61
C.? tumifrons, H. & W., 1877, pl. x, fig. 16	61
Agraulos, Corda	61
A.? globosus, n. s., Walcott, 1884, pl. ix, fig. 23	61–62
Arethusiana, Barrande	62
A. americana, n. s., Walcott, 1884, pl. ix, fig. 27	62–63
Ogygia, Brongniart	63
O.? spinosa, n. s., Walcott, 1884, pl. ix, fig. 23	63
O.? problematica, n. s., Walcott, 1884, pl. x, figs. 2 *a*, *b*, and 4	63–64

FOSSILS OF THE LOWER SILURIAN.

Pogonip Group.

Rhizopoda.	
Receptaculites Defrance	65
R. mammillaris, MSS., Newberry, 1880, pl. xi, fig. 11	65–66
R. elongatus, n. s., Walcott, 1884	66–67
R. ellipticus, n. s., Walcott, 1884, pl. xi, fig. 12	67
Brachiopoda.	
Obolella, Billings	67
O.? ambigua, n. s., Walcott, 1884, pl. i, figs. 2 *a–c*	67–68
Schizambon, n. g., Walcott, 1884	69–70
S. typicalis, n. s., Walcott, 1884, pl. i, figs. 3 *a–d*	70–71
Strophomena, Rafinesque	71
S. nemea, H. & W., 1877	71
Orthis, Dalman	72
O. perveta, Conrad, 1843, pl. xi, figs. 3 *a*, *b*	72
O. testudinaria, Dalman, 1827, pl. xi, figs. 10, 10 *a*	72–73
O. hamburgensis, n. s., Walcott, 1884, pl. xi, figs. 5, 5 *a*	73
O. lonensis, n. s., Walcott, 1884, pl. xi, figs. 6, 6 *a*	74
O. tricenaria, Conrad, 1843, pl. xi, figs. 4, 4 *a*	74–75
Streptorhynchus, King	75
S. minor, n. s., Walcott, 1884, pl. xi, fig. 9	75
Triplesia, Hall	75
T. calcifera, Billings, 1861, pl. xi, figs. 7, 8	75–76
Lamellibranchiata.	
Tellinomya, Hall	76
T. contracta, Salter? 1859, pl. xi, figs. 15, 15 *a*	76
T.? hamburgensis, n. s., Walcott, 1884, pl. xi, figs. 1, 1 *a*	76–77
Modiolopsis, Hall	77

	Page.
M. occidens, n. s., Walcott, 1884, pl. i, fig. 5, and pl. xi, figs. 14, 14 *a*	77–78
M. pogonipensis, n. s., Walcott, 1884, pl. i, fig. 6, and pl. xi, fig. 13	78
Gasteropoda.	
Raphistoma, Hall	78
R. nasoni, Hall, 1861, pl. xi, figs. 21, 21 *a*	78–79
Murchisonia, D'Archiac and De Verneuil	79
M. milleri, Hall ? 1877, pl. i, figs. 12, 12 *a*, *b*	79–80
Pleurotomaria, Defrance	80
P. lonensis, n. s., Walcott, 1884, pl. xi, fig. 22	80
Helicotoma, Salter	81
Helicotoma, sp. ? Walcott, 1884	81
Maclurea, Le Sueur	81
M. annulata, n. s., Walcott, 1884, pl. xi, figs. 19, 19 *a*	81–82
M. subannulata, n. s., Walcott, 1884, pl. xi, figs. 18, 18 *a*, *b*	82
M. carinata, n. s., Walcott, 1884, pl. xi, figs. 20, 20 *a*	82–83
Maclurea, sp. ? Walcott, 1884	83
Metoptoma, Phillips	83
M. phillipsi, n. s., Walcott, 1884, pl. i, figs. 4, 4 *a*	83–84
M. ? analoga, n. s., Walcott, 1884, pl. i, figs. 11, 11 *a*	84
Cyrtolites, Conrad	84
C. sinuatus, H. & W., 1877	84
Pteropoda.	
Coleoprion, Sandberger	85
C. minuta, n. s., Walcott, 1884, pl. xi, figs. 17, 17 *a*, and pl. xii, fig. 21	85
Hyolithes, Eichwald	85
H. vanuxemi, n. s., Walcott, 1884, pl. xi, figs. 16, 16 *a*, *b*	85–86
Cephalopoda.	
Orthoceratа, pl. xii, figs. 1, 1 *a–c*, 2, 3	86
Endoceras proteiforme, Hall ? 1847, pl. xii, figs. 1, 1 *a–c*	86
Orthoceras multicameratum, Hall ? 1847, pl. xii, fig. 3	86
Orthoceras, sp. ? Walcott, 1884, pl. xii, fig. 2	86
Endoceras multitubulatum, Hall ? 1847	87
Orthoceras, Walcott, 1884, pl. xii, fig. 1 *b* and figs. 1, 2, p. 87	87
Crustacea.	
Leperditia, Rouault	88
L. bivia, White, 1874	88
Beyrichia, McCoy	88
Beyrichia, sp. ? Walcott, 1884	88
Plumulites, Barrande	88
Pæcilopoda	89
Dicellocephalus, Owen	89
D. finalis, n. s., Walcott, 1884, pl. xii, figs. 12, 12 *a*, *b*	89–90
D. inexpectans, n. s., Walcott, 1884, pl. i, fig. 10	90
Ptychoparia, Corda	91
P. ? annectans, n. s., Walcott, 1884, pl. xii, fig. 18	91
Bathyurus, Billings	91
B. ? tuberculatus, n. s., Walcott, 1884, pl. xii, fig. 9	91–92
B. ? congeneris, n. s., Walcott, 1884, pl. xii, fig. 8	92–93
B. ? similimus, n. s., Walcott, 1884, pl. xii, fig. 11	93
Cyphaspis, Burmeister	93
C. ? brevimarginatus, n. s., Walcott, 1884, pl. xii, fig. 10	93–94
Amphion, Pander	94
A. nevadensis, n. s., Walcott, 1884, pl. xii, fig. 13	94
Ceraurus, Green	95
Ceraurus —— ? Walcott, 1884, pl. xii, fig. 17	93
Symphysurus, Goldfuss	95
S. ? goldfussi, n. s., Walcott, 1884, pl. xii, fig. 16	95
Barrandia, McCoy	90
B. mccoyi, n. s., Walcott, 1884, pl. xii, fig. 5	93
Barrandia ? sp. ? Walcott, 1884, pl. xii, fig. 6	96–97
Illaenurus, Hall	97
I. eurekensis, n. s., Walcott, 1884, pl. xii, figs. 4, 4 *a*	97–98
Asaphus, Brongniart	98
A. caribouensis, n. s., Walcott, 1884, pl. xii, figs. 7, 7 *a*, *b*	98
A. ? curiosus, Billings, 1865, pl. xii, fig. 15	98

FOSSILS OF THE DEVONIAN.

Porifera.

Palæomanon, Roemer

P. roemeri, n. s., Walcott, 1884, pl. xiii, fig. 12

Astylospongia, Roemer

Astylospongia, sp.? Walcott, 1884

Stromatopora, Goldfuss

Actinozoa.

Favosites hemispherica, Yandell & Shumard, 1876

Favosites basaltico, Goldfuss, 1829 10

Favosites, n. sp., Walcott, 1884

Fistulipora, sp.? Walcott, 1884

Alveolites rockfordensis, Hall? 1884

Cladopora pulchra, Rominger? 1876

Cladopora, sp. undt., Walcott, 1884

Thecia ramosa, Rominger? 1876 10

Syringopora hisingeri, Billings, 1859

Syringopora perelegans, Billings, 1859

Aulopora serpens, Goldfuss?

Cyathophyllum corniculum, Milne-Edwards?

Cyathophyllum rugosum, Edwards and Haime, 1876

Cyathophyllum davidsoni, Milne-Edwards, 1876

Cyathophyllum, n. s., Walcott, 1884 10

Cyathophyllum, n. s., Walcott, 1884

Acervularia pentagona, Goldfuss, 1877

Pachyphyllum woodmani (White), H. & W., 1884

Diphyphyllum simcoense, Billings, 1876 10

Cystiphyllum americanum, Milne-Edwards, 1876

Cystiphyllum, n. s., Walcott, 1884

Brachiopoda.

Lingula, Bruguière

L. læna, Hall, 1867, pl. xiii, fig. 2 10

L. ligea, Hall, 1860, pl. ii, fig. 2

L. ligea, var. *nevadensis*, n. var., Walcott, 1884, pl. ii, fig. 3

L. alba-pinensis, n. s., Walcott, 1884, pl. ii, figs. 1, 1 *a*

L. lonensis, n. s., Walcott, 1884, pl. xiii, figs. 1, 1 *a* 10

L. whitei, n. s., Walcott, 1884, pl. xiii, fig. 3 10

Discina, Lamarck

D. minuta, Hall, 1843, pl. xiii, fig. 5

Discina, sp.? Walcott, 1884

D. lodensis, Hall, 1843, pl. ii, figs. 5, 5 *a* 11

Pholidops, Hall

P. bellula, n. s., Walcott, 1884, pl. ii, figs. 6, 6 *a*, *b* 11

P. quadrangularis, n. s., Walcott, 1884, pl. ii, fig. 7

Orthis, Dalman

O. mcfarlanei, Meek, 1868

O. impressa, Hall, 1843, pl. xiii, fig. 13

O. tulliensis, Vanuxem, 1842, pl. ii, figs. 12, 12 *a* 11

Skenidium, Hall

S. devonicum, n. s., Walcott, 1884, pl. xiii, figs. 4, 4 *a*

Streptorhynchus, King

S. chemungensis, Conrad sp., 1842, pl. xiii, figs. 7 and 16 11

Strophomena, Blainville

S. rhomboidalis, Wilckens, sp

Strophodonta, Hall

S. demissa, Conrad, sp., 1842, pl. ii, figs. 9, 9 *a*, *b* 11

S. patersoni, Hall, 1857

S. inequiradiata, Hall, 1857, pl. xi, figs. 11, 11 *a*

S. perplana, Conrad, sp., 1842, pl. xiii, fig. 11 12

S. punctulifera, Conrad, sp., pl. xiii, fig. 10

S. arcuata, Hall? 1858

S. calvini, Miller, 1883, pl. xiii, fig. 6

Chonetes, Fischer 12

C. hemispherica, Hall, 1857

C. deflecta, Hall, 1857, pl. ii, figs. 8, 8 *a*, *b*

	Page.
C. mucronata, Hall?, 1843	124–125
C. setigera, Hall, 1843	125
C. macrostriata, n. s., Walcott, 1884, pl. ii, fig. 13, pl. xiii, figs. 14, 14 *a–c*	126–127
C. filistriata, n. s., Walcott, 1884, pl. xiii, figs. 15, 15 *a*	127–128
Productus, Sowerby	128
Subgenus *Productella*, Hall, 1867	128
P. (Productella) subaculeatus, Murch, pl. vii, fig. 2, pl. xiii, figs. 19, 19 *a*, 20, 20 *a*	128–129
P. (Productella) shumardianus, Hall, 1858, pl. xiv, fig. 1	129–130
P. (Productella) hallanus, n. s., Walcott, 1884, pl. xiii, figs. 17, 17 *a*	130–131
P. (Productella) navicella, Hall, 1857, pl. xiii, fig. 9	131
P. (Productella) truncatus, Hall, 1857, pl. xiv, fig. 2	131–132
P. (Productella) lachrymosus var. *limus*, Conrad, sp., 1842, pl. xiii, figs. 18, 18 *a*	132
P. (Productella) lachrymosus var. *stigmatus*, Hall, 1867	132–133
P. (Productella) speciosus, Hall, 1857, pl. xiii, fig. 8	133
P. hirsutiforme, n. s., Walcott, 1884, pl. ii, figs. 10, 10 *a*	133–134
Spirifera, Sowerby	134
S. disjuncta, Sowerby, 1840	134–135
S. raricosta, Conrad, sp., 1842, pl. iv, figs. 2, 2 *a*, pl. xiv, fig. 12	135
S. varicosa, Hall, 1857	136
S. parryana, Hall?, 1858, pl. xiv, fig. 10	137
Spirifera (sp. undt.), Walcott, 1884	137
S. englemanni, Meek, 1860	138
S. pinonensis, Meek, 1870, pl. iv, figs. 1, 1 *a–f*	138
Subgenus *Martinia*, McCoy	139
S. (Martinia) glabra, Martin	139
S. (Martinia) glabra var. *nevadensis*, n. var. Walcott, 1884, pl. iii, fig. 5, pl. xiv, figs. 14, 14 *a*, b	139–140
S. (Martinia) maia, Billings, 1860, pl. iii, figs. 1, 1 *a–e*, pl. xiv. figs. 13, 13 *a*	141–142
S. (Martinia) undifera, Roemer, 1844, pl. iii, figs. 3, 3 *a*, *b*; 6, 6 *a*, pl. xiv, figs. 11, 11 *a*, *b*.	143–146
Cyrtina, Davidson	146
C. davidsoni, n. s., Walcott, 1884, pl. iii, figs. 2, 2 *a–c*	146–147
C. hamiltonensis, Hall, 1857	147
Nucleospira, Hall	147
N. concinni, Hall, 1843	147
Athyris, McCoy	148
A. angelica, Hall, 1861	148
Athyris (sp. undt.), Walcott, 1884	148
Meristella, Hall	148
Whitfieldia, Davidson	148
M. (Whitfieldia) nasuta, Conrad, sp., 1842, pl. iii, fig. 8, 8 *a*, *b*	148–149
Atrypa, Dalman	150
A. reticularis (Linnæus, sp.), Dalman, pl. xiv, figs. 6, 6 *a*, *b*	150
A. desquamata, Sowerby, pl. xiv, figs. 4, 4 *a*	150–151
Trematospira, Hall	151
T. infrequens, Hall, n. s., Walcott, 1884, pl. iv, figs. 3, 3 *a*, *b*	151
Rhynchonella, Fischer	152
R. horsfordi, Hall, 1860, pl. xiv, fig. 3; pl. xv, fig. 6	152
R. tethys, Billings, 1860	152
R.? occidens, n. s., Walcott, 1884, pl. xv, figs. 3, 3 *a*, *b*	152–153
R. castanea, Meek, 1868, pl. xv, figs. 1, 1 *a*; 4, 4 *a*	153–155
R. duplicata, Hall, 1843, pl. xiv, fig. 8	155
R. pugnus, Martin, 1809, pl. xiv, figs. 7, 7 *a*	155–157
R. emmonsi, H. & W., 1877	157
Subgenus *Leiorhynchus*, Hall	157
R. (Leiorhynchus) nevadensis, n. s., Walcott, 1884, pl. xiv, figs. 9, 9 *a*, *b*	157–158
R. (Leiorhynchus) sinuatus, Hall, 1867, pl. xiv. fig. 5	158–159
R. (Leiorhynchus) laura, Billings, 1860	159
Pentamerus, Sowerby	159
Subgenus *Gypidula* Hall	159
P. comis, Owen, 1852, pl. iii, figs. 4, 7; pl. xiv, figs. 15, 15 *a*, *b*; pl. xv, figs. 5, 5 *a*, *b*	159–161
P. lotis, n. s., Walcott, 1884, pl. iii, figs. 9, 9 *a–c*	161–162
Cryptonella, Hall	163
C.? circula, n. s., Walcott, 1884, pl. xv, figs. 2, 2 *a*, *b*	163
C. pinonensis, n. s., Walcott, 1884, pl. iv, figs. 4, 4 *a*, *b*	163–164

Pa

Lamellibranchiata.
Pterinea, Goldfuss
P. flabella, Conrad, sp. 1842, pl. xv, fig. 12; pl. v, fig. 6
P. newarkensis, n. s., Walcott, 1884, pl. v, fig. 12 165
Actinopteria, Hall
A. boydi, Conrad, sp., 1842, pl. v, fig. 2
Leiopteria, Hall, 1883, pl. v, figs. 10, 10 *a*
L. rafinesquii, Hall, 1883, pl. v, figs. 10, 10 *a*
Leptodesma, Hall
L. transversa, n. s., Walcott, 1884, pl. v, fig. 13
Limoptera, Hall
L. sarmenticia, n. s., Walcott, 1884, pl. v, figs. 3, 3 *a*, *b* 167
Mytilarca, Hall
M. dubia, n. s., Walcott, 1884, pl. iv, fig. 5
M. chemungensis, Conrad, 1842, pl. iv, fig. 9 168
Subgenus *Plethomytilus*, Hall
M. (*Plethomytilus*) *oviformis*, Conrad, 1842, pl. v, fig. 11
Modiomorpha, Hall
M. altiforme, n. s., Walcott, 1884, pl. v, fig. 9 169
M. oblonga, n. s., Walcott, 1884, pl. v, fig. 7
M. obtusa, n. s., Walcott, 1884, pl. iv, figs. 8, 8 *a*
Goniophora, Phillips
G. perangulata, Hall, 1870, pl. xv, fig. 10
Nucula, Lamarck
N. rescuensis, n. s., Walcott, 1884, pl. xv, fig. 9
Nucula, sp. ? Walcott, 1884
Dystactella, Hall
D. insularis, n. s., Walcott, 1884, pl. xv, fig. 8 172
Megambonia, Hall
M. occidualis, n. s., Walcott, 1884, pl. v, fig. 1
Nyassa, Hall
N. parva, n. s., Walcott, 1884, pl. xv, figs. 14, 14 *a* 173
Grammysia, De Verneuil
G. minor, n. s., Walcott, 1884, pl. xv, figs. 15, 15 *a* 174
Sanguinolites, McCoy
S.? combensis, n. s., Walcott, 1884, pl. xv, fig. 16
S.? gracilis, n. s., Walcott, 1884, pl. iv, fig. 10 175
S. rigidus, White & Whitfield, 1862, pl. xvi, fig. 6
S.? sandusky ensis, Meek, 1871, pl. v, fig. 4 176
S. ventricosus, White & Whitfield, sp., 1862, pl. xv, fig. 13
Conocardium, Brown
C. nevadensis, n. s., Walcott, 1884, pl. xvi, figs. 4, 4 *a* 177
Paracyclas, Hall
P. occidentalis, H. & W., 1872
Posidonomya, Bronn
P. lævis, n. s., Walcott, 1884, pl. iv, fig. 6 178
P. devonica, n. s., Walcott, 1884, pl. iv, fig. 7 179
Microdon, Conrad
Subgenus *Cypricardella*, Hall
M. (*Cypricardella*) *macrostriatus*, n. s., Walcott, 1884, pl. v, fig. 5
Anodontopsis, McCoy
A. amygdaleæformis, n. s., Walcott, 1884, pl. xv, figs. 7, 7 *a*, *b* 180
Schizodus, King
Subgenus *Cytherodon*, Hall
S. (*Cytherodon*) *orbicularis*, n. s., Walcott, 1884, pl. v, figs. 8, 8 *a*
Cypricardinia, Hall
C. indenta, Conrad, sp., 1842, pl. v, fig. 14; pl. xv, fig. 11
Gasteropoda.
Platyceras, Conrad
P. conradi, n. s., Walcott, 1884, pl. xvi, figs. 1, 1 *a* 181
P. nodosum, Conrad, 1841, pl. vi, figs. 5, 5 *a*, *b*
P. undulatum, n. s., Walcott, 1884, pl. vi, figs. 2, 2 *a*
P. thetiforme, n. s., Walcott, 1884, pl. vi, figs. 4, 4 *a*, *b*
Platyostoma, Conrad
P. lineatum, Conrad, 1842

	Page.
Euomphalus, Sowerby	185
E. eurekensis, n. s., Walcott, 1884, pl. xvi, figs. 2, 2 *a*	185–186
E. (Phanerotinus) laxus, Hall, 1861, pl. vi, fig. 3	186
Ecculiomphalus, Portlock	187
E. devonicus, n. s., Walcott, 1884, pl. vi, figs. 6, 6 *a*	187
Straparollus, Montfort	187
S. nevadensis, n. s., Walcott, 1884, pl. xvi, figs. 7, 7 *a*	187–188
Platyschisma, McCoy	188
P.? meeki, n. s., Walcott, 1884, pl. xvii, figs. 1, 1 *a–c*	188
P.? ambiguum, n. s., Walcott, 1884, pl. xvii, figs. 3, 3 *a*	188–189
Callonema, Hall	189
C. occidentalis, n. s., Walcott, 1884, pl. xvi, figs. 3, 3 *a*	189
Loxonema, Phillips	190
L. eurekensis, n. s., Walcott, 1884, pl. xvi, fig. 8	190
L. nobile, n. s., Walcott, 1884, pl. xvi, fig. 9	190–191
L.? subattenuatum, Hall? 1861	191
L. approximatum, n. s., Walcott, 1884, pl. vi, fig. 7	191–192
Loxonema? sp. undt., Walcott, 1884	192
Loxonema, sp. undt., Walcott, 1884	192
Bellerophon, Montfort	192
B. perplexa, n. s., Walcott, 1884, pl. xvii, figs. 6, 6 *a*, *b*	193
B. combsi, n. s., Walcott, 1884, pl. xvii, figs. 9, 9 *a*, *b*	193–194
B. lyra, Hall	194
B. leda, Hall	194
B. mæra, Hall?	194
B. pelops, Hall?	194
Scoliostoma, Braun	195
S. americana, n. s., Walcott, 1884, pl. vi, figs. 1, 1 *a–c*	195
Metoptoma, Phillips	195
M.? devonica, n. s., Walcott, 1884, pl. xvii, figs. 2, 2 *a*	195–196
Pteropoda.	
Tentaculites, Schlotheim	196
T. gracilistriatus, Hall	196–197
T. scalariformis, Hall	197
T. attenuatus, Hall	197
T. bellulus, Hall?	197
Styliola, Le Sueur	197
S. fissurella, Hall	197
S. fissurella var. *intermittens*, Hall	197–198
Conularia, Miller	198
Conularia, sp. undt., Walcott, 1884	198
Hyolithes, Eichwald	199
Hyolithes, sp. (?), Walcott, 1884, pl. vi, figs. 8, 8 *a*	199
Coleolus, Hall	199
C. lævis, n. s., Walcott, 1884, pl. vi, fig. 9	199–200
Cephalopoda.	
Orthoceras, Breynius	200–202
Gomphoceras, Sowerby	202
G. subuviforme, n. s., Walcott, 1884, pl. xvii, figs. 8, 8 *a*	202–203
Cyrtoceras, Goldfuss	203
C. nevadense, n. s., Walcott, 1884, pl. xvii, figs. 7, 7 *a*	203
Goniatites, De Haan	203
G. desideratus, n. s., Walcott, 1884, pl. xvii, fig. 10	203–204
Crustacea.	
Beyrichia, McCoy	204
B. (Primitia) occidentalis, n. s., Walcott, 1884, pl. xvii, figs. 4, 4 *a*	204–205
Leperditia, Rouault	206
L. rotundata, n. s., Walcott, 1884, pl. xvi, fig. 5	206
Pœcilopoda.	
Phacops, Emmerich	207
P. rana, Green, sp., 1832	207
Dalmanites, Emmerich	207
D. meeki, n. s., Walcott, 1884, pl. xvii, figs. 5, 5 *a–c*	207–209
Dalmanites, undt. sp., Walcott, 1884	210
Prœtus, Stetninger	210

P. haldemani, Hall, 1861 .....
P. marginalis, Conrad, sp., 1839 .....
Phillipsia, Portlock .....
P. coronata, Hall ? 1876 .....
Supposed eggs of the Trilobite .....

FOSSILS OF THE CARBONIFEROUS.

Echinodermata.
Archæocidaris, McCoy .....
Archæocidaris, sp., ? Walcott, 1884 .....
Brachiopoda.
Discina, Lamarck .....
D. newberryi, Hall, 1863, pl. xviii, figs. 3, 2, 2 *a* ? .....
D. nitida, Phillips, 1836, pl. vii, figs. 4, 4 *a* .....
D. connata, n. s, Walcott, 1884, pl. vii, fig. 3, 3 *a* .....
Productus, Sowerby .....
P. subaculeatus, Murch., pl. vii, fig. 2 .....
Spirifera, Sowerby .....
S. trigonalis, Martin, sp., 1809, pl. xviii, fig. 11 .....
S. leidyi, N. & P., 1855, pl. xviii, figs. 4, 4 *a* .....
S. annectans, n. s., Walcott, 1884, pl. xviii, figs. 7, 7 *a* .....
S. neglecta, Hall, 1858, pl. xviii, fig. 10 .....
S. desiderata, n. s., Walcott, 1884, pl. vii, fig. 8 .....
Subgenus *Spiriferina*, D'Orbigny .....
S. (Spiriferina) cristata, Schlotheim, 1816, pl. xviii, figs. 12, 13 .....
Syringothyris, Winchell .....
S. cuspidata, Martin, sp., 1796 .....
Retzia, King .....
R. radialis, Phillips, sp., 1836, pl. vii, figs. 5, 5 *a–h* .....
Athyris, McCoy .....
A. hirsuta, Hall, 1857, pl. xviii, fig. 5 .....
Rhynchonella, Fischer .....
R. eurekensis, n. s., Walcott, 1884, pl. xviii, figs. 8, 8 *a–c* .....
R. thera, n. s., Walcott, 1884, pl. vii, figs. 6, 6 *a–c* .....
Camarophoria, King .....
C. cooperensis, Shumard, 1855, pl. xviii, fig. 6 .....
Terebratula, Llhwyd .....
T. hastata, Sowerby .....
Lamellibranchiata.
Aviculopecten, McCoy .....
A. haguei, n. s., Walcott, 1884, pl. xix, fig. 4 .....
A. eurekensis, n. s., Walcott, 1884, pl. xix, figs. 2, 3 .....
A. peroccidens, n. s., Walcott, 1884, pl. viii, fig. 8 .....
A. pintöensis, n. s., Walcott, 1884, pl. viii, fig. 6 .....
A. affinis, n. s., Walcott, 1884, pl. xix, figs. 1, 1 *a* .....
Aviculopecten, sp. ? Walcott, 1884 .....
Streblopteria, McCoy .....
S. similis, n. s., Walcott, 1884, pl. viii, figs. 4, 4 *a–d*, and pl. xix, fig. 7 .....
Crenipecten, Hall .....
C. hallanus, n. s., Walcott, 1884, pl. viii, figs. 7, 7 *a–c* .....
Pterinopecten, Hall .....
P. hoosacensis, n. s., Walcott, 1884, pl. viii, fig. 9 .....
P. spio, n. s., Walcott, 1884, pl. viii, figs. 1, 1 *a* .....
Pterinea, Goldfuss .....
P. pintöensis, n. s., Walcott, 1884, pl. xix, fig. 10 .....
Leptodesma, Hall .....
Leptodesma, sp. ? Walcott, 1884 .....
Ptychopteria, Hall .....
P. protoforme, n. s., Walcott, 1884, pl. viii, fig. 5 .....
Pinna, Linnæus .....
P. inexpectans, n. s., Walcott, 1884, pl. xix, fig. 11 .....
P. consimilis, n. s., Walcott, 1884, pl. xx, fig. 13 .....
Myalina, De Koninck .....
M. congeneris, n. s., Walcott, 1884, pl. xix, fig. 6, and pl. xxii, fig. 10 .....
M. nemesis, n. s., Walcott, 1884, pl. xix, fig. 5, and pl. xxii, fig. 7 .....
M. nessus, n. s., Walcott, 1884, pl. xxii, figs. 8, 8 *a* .....

	Page.
Mediola, Lamarck	239
M.? nevadensis, n. s., Walcott, 1884, pl. xix, fig. 8	239
Mediomorpha, Hall	239
M. ambigua, n. s., Walcott, 1884, pl. xx, fig. 1	239-240
M.? desiderata, n. s., Walcott, 1884, pl. xx, fig. 3	240
M.? pintoensis, n. s., Walcott, 1884, pl. xx, fig. 2	240-241
Nucula, Lamarck	241
N. insularis, n. s., Walcott, 1884, pl. xx, fig. 14	240
N. levatiformis, n. s., Walcott, 1884, pl. xxii, figs. 1, 1 *a*	241-242
Solenomya, Lamarck	242
S. curta, n. s., Walcott, 1884, pl. xxii, figs. 6, 11	242
Macrodon, Lycett	243
M. hamiltonæ, Hall, 1870, pl. xxiii, figs. 5, 5 *a–c*	243
M. truncatus, n. s., Walcott, 1884, pl. viii, fig. 2	243-244
Grammysia, De Verneuil	244
G. hannibalensis, Shumard, sp., 1855, pl. xx, fig. 4	244
G. arcuata, Conrad, sp., 1841, pl. xx, fig. 5	245
Edmondia, De Koninck	245
E. medon, n. s., Walcott, 1884, pl. xxiii, fig. 6	245
E.? circularis, n. s., Walcott, 1884, pl. xxii, fig. 9	246
Pleurophorus, King	246
P. meeki, n. s., Walcott, 1884, pl. viii, fig. 3	246
Sanguinolites, McCoy	247
S. æolus, H. & W., 1870, pl. xx, figs. 6, 7, 9	247
S. retusus, n. s., Walcott, 1884, pl. xx, fig. 10	247-248
S. simplex, n. s., Walcott, 1884, pl. xx, fig. 11	248
S. salteri, n. s., Walcott, 1884, pl. xx, fig. 12	248-249
S.? nania, n. s., Walcott, 1884, pl. xix, fig. 9	249
S. striatus, n. s., Walcott, 1884, pl. xxiii, fig. 7	249-250
Microdon, Conrad	250
Subgenus *Cypricardella*, Hall	250
M. (Cypricardella) connatus, n. s., Walcott, 1884, pl. xxiv, figs. 5, 5 *a*	250-251
Cardiola, Broderip	251
C.? filicostata, n. s., Walcott, 1884, pl. xxii, figs. 4, 4 *a*	251
Schizodus, King	252
S. cuneatus, Meek, 1875, pl. xx, fig. 8	252
S. depressus, n. s., Walcott, 1884, pl. xxii, fig. 5	252
S. curtiformis, n. s., Walcott, 1884, pl. xxii, figs 3, 3 *a*	253
S. pintoënsis, n. s., Walcott, 1884, pl. xxii, figs. 2, 2 *a*	253-254
Gasteropoda.	
Platyceras, Conrad	254
P. occidens, n. s., Walcott, 1884, pl. xxiv, figs. 9, 9 *a*	254
P. pico, n. s., Walcott, 1884, pl. xxiv, figs. 7, 7 *a*, *b*	254-255
Platyostoma, Conrad	255
P. inornatum, n. s., Walcott, 1884, pl. xxiv, figs. 3, 3 *a*	255
Euomphalus, Sowerby	255
E. (Straparollus) subrugosus, M. & W., 1873, pl. xviii, fig. 19	255-256
Bellerophon, Montfort	256
B. majusculus, n. s., Walcott, 1884, pl. xxiii, figs. 1, 1 *a*; pl. xxiv, fig. 6, and fig. 2, p. 257	256-257
B. tactilis, Hall, † 1877, pl. xviii, fig. 18	257-258
Loxonema, Phillips	258
L. bella, n. s., Walcott, 1884, pl. xxiv, figs. 1, 1 *a*	258-259
Pleurotomaria, Defrance	259
P. nodomarginata, McChesney, 1860, pl. xviii, fig. 15	259
P. nevadensis, n. s., Walcott, 1884, pl. xxiv, figs. 2, 2 *a*	259-260
Macrocheilus, Phillips	260
Macrocheilus, sp., † Walcott, 1884, pl. xxiv, fig. 4	260
Metoptoma, Phillips	260
M. paracelsus, n. s., Walcott, 1884, pl. xviii, fig. 16	260
Ampullaria, Lamarck	261
A.? powelli, Walcott, 1882, figs. 4, 5, p. 261	261
Pulmonifera.	
Physa, Draparnaud	262
P. prisca, Walcott, 1882, fig. 6, p. 262	262
Zaptychius, Walcott, 1882	263
Z. carbonaria, Walcott, 1882, fig. 7, p. 262	263

Page.
Pteropoda.
Conularia, Miller 264
C. missouriensis, Swallow, ? 1860, pl. xxiii, fig. 4 264
Hyolithes, Eichwald 264
H. carbonaria, n. s., Walcott, 1884, pl. xxiii, fig. 3 264
Cephalopoda.
Orthoceras, Breynius 265
O. randolphensis, Worthen, ? 1882, pl. xviii, fig. 17 265
O. eurekensis, n. s., Walcott, 1884, pl. xxiii, figs 2, 2 *a* 265-266
Orthoceras, sp., ? Walcott, 1884 266
Pœcilopoda.
Griffithides, Portlock 266
G. portlocki, M. & W., 1865, pl. xxiv, figs 4, 4 *a*, *b* 266-267
Systematic list of fossils of each geologic formation 268-281
Paleozoic section in Central Nevada 283-285

24.

WALCOTT, C. D.—On the Cambrian Faunas of North America; Preliminary studies. <Bull. U. S. Geol. Surv. No. 10, pp. 1–74, pl. i–x. Washington, 1884.

This contains three parts. The first is a "Review of the fauna of the Saint John formation, contained in the Hartt collection." Mr. Matthew proposed the specific names for the new species excepting for one, *Harttia matthewi*, the type of the n. g. *Harttia*, Walcott. The author does not accept the genus *Conocephalites* and refers its different species to some of *Ptychoparia* and one of *Conocoryphe*. The following species are mentioned:

Page.
Eocystites, Billings 14, 294
E. primævus, Billings, 1868, pl. i, fig. 2 ..... 14-15, 294-295
Lingula, Bruguière 15, 295
L. ? dawsoni, n. s., Matthew, MSS., 1884, pl. v, fig. 8 ..... 15, 295
Acrothele, Linnarson 15, 295
A. matthewi, Hartt, sp., 1868, pl. i, figs. 4, 4 *a* 15-16, 295-296
Obolella, Billings 16, 296
O. tranversa, Hartt, 1868, pl. i, figs. 5, 5 *a* 16, 299
Obolella, sp., undt., Walcott, 1884 ..... 16-17, 296-297
Orthis, Dalman 17, 297
O. billingsi, Hartt, 1868, pl. i, figs 1, 1 *b–d* 17-18, 297-298
Orthis, ? sp., Walcott, 1884, pl. i, fig. 1 *a* 18, 298
Harttia, n. g., Walcott, 1884 ..... 18-19, 298-299
H. matthewi, n. s., Walcott, 1884, pl. i, fig. 3 ..... 19, 299
Palæacmea, H. and W. (*Stenotheca*) 19, 299
Stenotheca acadica, Hartt, sp., 1868, pl. i, fig. 6 ..... 19, 299
Hyolithes, Eichwald 20, 300
H. acadica, n. s., Hartt, sp., MSS., 1884, pl. ii, fig. 5 ..... 20, 300
H. danianus, n. s., Matthew, MSS., 1884, pl. ii, figs. 7 *a*, *b* 20-21, 300-301
H. micmac, n. s., Matthew, MSS., 1884, pl. ii, fig. 6 ..... 21-22, 301-302
Agnostus, Brongniart 22, 302
A. acadicus, Hartt, 1868, pl. ii, figs. 2 2 *a–c* 22-23, 302-303
Microdiscus, Emmons 23, 303
M. dawsoni, Hartt, 1868, pl. ii, figs. 3, 3 *a* 23, 303
M. punctatus, Salter, 1864, pl. ii, figs. 1, 1 *a–c* 24-25, 303-304
Paradoxides, Brongniart 25, 305
P. lamellatus, Hartt, 1868, pl. iii, figs. 2, 2 *a* 25, 305
P. acadicus, Matthew, 1882, pl. iii, figs. 3, 3 *a* 25-27, 305-307
P. steminicus, Matthew, 1883, pl. iii, figs. 1, 1 *a–g* 27, 307
Conocoryphe, Corda 28, 308
C. (Subgenus ?), *matthewi*, Hartt, sp., 1868, pl. iv, figs. 1, 1 *a*, *b* 28-30, 308-310
C. walcotti, Matthew (in lit.), 1884 ..... 30-31, 310-311
Bailiella (new subgenus), Matthew, 1884 ..... 31-32, 311-312
C. (*Bailiella*), *baileyi*, Hartt, sp., 1868, pl. iv, figs. 3, 3 *a*; pl. v, figs. 7, 7 *a* 32-33, 312-313
C. elegans, Hartt, sp., 1868, pl. iv, figs. 2, 2 *a*, *b* 33-34, 313
Ptychoparia, Corda ..... [illegible]
P. robbi, Hartt, sp., 1868, pl. vi, figs. 1, ? ..... [illegible]
P. ouangondiana, Hartt, sp., 1868, ? ..... [illegible]

Page.
P. euangendiana var. *aurora*, Hartt, sp., 1868, pl. v, fig. 5 ..... 38–39, 318–319
P. quadratus, Hartt, sp., 1868, pl. v, fig. 1 ..... 39, 319
P. erastes, Hartt, sp., 1868, pl. v, figs. 3, 3 *a* 39–40, 319–320
P. erastes var. *thersites*, Hartt, sp., 1868, pl. v, fig. 2 ..... 40–41, 320–321
P. tener, Hartt, sp., 1868, pl. v, figs. 6, 6 *a*, *b* 41–42, 321–322

The second part is on the "Fauna of the Braintree argillites." The author doubts the specific difference between *Paradoxides harlani* and *P. bennetti*. He describes the following forms:

Page.
Hyolithes, Eichwald 44, 324
H. chaleri, n. s., Walcott, 1884, pl. vii, figs. 4, 4 *a–c* 44–45, 324–325
Paradoxides, Brongniart 45, 325
P. harlani, Green, 1834, pl. vii, fig. 3; pl. viii, figs. 1, 1 *a–c*; pl. ix, fig. 1 ..... 45–47, 325–327
Ptychoparia, Corda 47, 327
P. rogersi, n. s., Walcott, 1884, pl. vii, fig. 2 ..... 47–48, 327–328
Agraulos, Corda 48, 328
A. quadrangularis, Whitfield, sp., 1884, pl. vii, fig. 1 ..... 48–49, 328–329

The third part is "On a new genus and species of Phyllopods from the middle Cambrian."

Page.
Protocaris, n. g., Walcott, 1884 ..... 50, 330
P. marshi, n. s., Walcott, 1884, pl. x, fig. 1 ..... 50–51, 350–351

25.

LCOTT, C. D. Paleontologic Notes. <Amer. Jour. Sci., 3d ser., vol. xxix, February, pp. 114–117, pl. on p. 116. New Haven, 1885.

OBOLIDÆ.

Page
Linnarssonia, n. g., Walcott, 1885 115
Obolella chromatica, figs. 1, 2, p. 116 116
Linnarssonia transversa, Hartt, sp., figs. 3, 4, p. 116 116
L. sagittalis, figs. 5–8, p. 116 116
L. transversa, figs. 6, 7, p. 116 116

26.

LCOTT, C. D. Paleozoic Notes; New Genus of Cambrian Trilobites, Mesonacis. <Amer. Jour. Sci., 3d ser., vol. xxix, April, pp. 328–330, figs. 2. New Haven, 1885.

Page.
Mesonacis, n. g., Walcott, 1885, figs. 1, 2, p. 329 328–330

27.

LCOTT, C. D. Note on some Paleozoic Pteropods. <Amer. Journ. Sci., 3d ser., vol. xxx, July, pp. 17–21, figs. 1–6. New Haven, 1885.

Page.
Matthevia, n. g., Walcott, 1885 17–18
M. variabilis, n. s., Walcott, 1885, figs. 1–6, p. 20 18–19
Note on Hyolithes (Camarotheca) emmonsi, Ford 19–21

PART IV.

PUBLICATIONS BASED UPON THE PALEONTOLOGICAL COLLECTIONS OF THE UNITED STATES GOVERNMENT

BY

JACOB WHITMAN BAILEY,
TIMOTHY ABBOTT CONRAD,
JAMES DWIGHT DANA,
CHRISTIAN GOTTFRIED EHRENBERG,
JAMES HALL,
ANGELO HEILPRIN,
ALPHEUS HYATT,
JULES MARCOU,
JOHN STRONG NEWBERRY,
I. N. NICOLLET,
DAVID DALE OWEN,
HIRAM A. PROUT,
JAMES SCHIEL,
BENJAMIN F. SHUMARD,
ROBERT PARR WHITFIELD.

I.—THE WRITINGS OF JACOB WHITMAN BAILEY.

1.

LEY, J. W. [Descriptions of fossil fresh-water infusoria from Oregon.] <Rep. Expl. Exp. to the Rocky Mountains and to Oregon and North California, by J. C. Frémont. Appendix A. Geological formations by James Hall, p. 302, pl. v. Washington, 1845.

	Page.
Eunotia librile, Ehrenberg, pl. v, figs. 1, 2, 3	302
Eunotia gibba, Ehr., pl. v, figs. 4, 5	302
Pinnularia pachyptera?, Ehr., pl. v, figs. 6	302
Cocconema cymbiforme?, Ehr., pl. v, figs. 7, 8, 9	302
Gomphonema clavatum?, Ehr., pl. v, figs. 10, 11	302
Gomphonema minutissimum, Ehr., pl. v, fig. 12	302
Gallionella——, n. s., J. W. Bailey, 1845, pl. v, figs. 13, 14, 15	302
Gallionella distans?, J. W. Bailey, pl. v, fig. 16	302
Cocconeis prœtexta, Ehr., pl. v. figs. 17, 18	302
Fragillaria, J. W. Bailey, 1845, pl. v, fig. 19	302
Surirella, J. W. Bailey, 1845, pl. v. fig. 20	302
Fragillaria rhabdosoma?, J. W. Bailey, 1845, pl. v, fig. 21	302
Spiculæ of fresh-water sponges, pl. v, figs. 22, 23	302
——?, pl. v, fig. 24	302
Scale = 10-100ths of millimeter magnified equally with drawings, pl. v, fig. 25	302

2.

LEY, J. W. Letter upon Infusorial Fossils submitted to him by Dr. Schiel. <Rep. Expls. and Surys. from the Mississippi River to the Pacific Ocean. Report of Expls. for a route for the Pacific Railroad of the line of the forty-first parallel of north latitude, by Lieut. E. G. Beckwith, 1854. Vol. ii, chap. x, pp. 111, 112, pl. iii (pars.). Washington, 1855.

	Page.
Epithemia, pl. iii, figs. 5, 6	111
Cocconema asperum, Ehr	111
Cocconema cymbiforme, Ehr	111
Discoplea atmospherica, Ehr	111
Surirella campylodiscus?, Ehr., pl. iii, fig. 4	111
Cocconeis, pl. iii, fig. 3	111
Cymbella gibba, n. s., Bailey, 1855, pl. iii, fig. 1	111
Cymatopleura? campylodiscus, n. s., Bailey, 1855, pl. iii, figs. 2 *a*, *b*	111
Galleinella, pl. iii, figs. 7 *a*, *b*	112
Galleinella varians	112
Stephanodiscus——?	112
Pennularia nobilis, Ehr.	112
Pennularia viridis	112
Epithemia	112
Surirella splendida (? Ehr.)	112
Pollen of pine	112
Spongiolites	112

II.—THE WRITINGS OF TIMOTHY ABBOTT CONRAD.

1.

ONRAD, T. A. Observations on a portion of the Atlantic Tertiary region, with a description of New Species of organic remains. <2d Bull. Proc. Natl. Institution, pp. 171–194, pls. i and ii. Washington, 1842.

	Page.
Section of the cliff at Claiborne	174
Classification of Tertiary formations	176
Table of Atlantic supracretaceous deposits	177
Geographical range of Lower Tertiary	178
Geographical range of Medial Tertiary	179
Localities of the Upper Tertiary	176
Medial Tertiary period	180
Section at Fair Haven	181
List of species obtained	181–182
(Section) Cliff near Beckett's	182
(List of fossils)	185
(Section) Saint Mary's River	185
Organic remains found on Saint Mary's River	186–187
Post-Pliocene period	187
Upper Tertiary formation	187
(Sections near Patuxent River)	188
Section near the mouth of Potomac	189
(List of species)	190
List of Fossil shells at Benner's	191–192
Descriptions of new Tertiary fossils	192
Lower Tertiary or Eocene fossils	192
Ostrea, Linnæus	192
O. sellæformis, n. s., Conrad, 1842, pl. i, fig. 1	192–193
Pholadomya	193
P. marylandica, n. s., Conrad, 1842, pl. i, fig. 3	193
Pholas	193
P. petrosa, n. s., Conrad, 1842, pl. ii, fig. 4	193
Isocardia, Lamarck	193
I. markoëi, n. s., Conrad, 1842, pl. ii, fig. 1	193
Pecten, Lamarck	194
P. humphreysii, n. s., Conrad, 1842, pl. ii, fig. 2	194
Dispotæa, Say	194
D. constricta, n. s., Conrad, 1842, pl. i, fig. 2	194
Scalaria, Lamarck	194
S. expansa, n. s., Conrad, 1842, pl. ii, fig. 3	194
Buccinum, Lamarck	194
B. integrum, n. s., Conrad, 1842, pl. ii, fig. 5	194
Scutella, Lamarck	194
S. aberti, n. s., Conrad, 1842	194

2.

RAD, T. A. [Descriptions of the fossil shells of Astoria, Oregon.] <U. S. Expl. Exp. under the command of Charles Wilkes, vol. x, Geology, Appendix i, pp. 723–728, pls. xvii–xxi. Philadelphia, 1849.

	Page.
Mya abrupta, n. s., Conrad, 1849, pl. xvii, figs. 5, 5 *a*	723
Thracia trapezoides, n. s., Conrad, 1849, pl. xvii, figs. 6 *a*, *b*	723
ventricosa, n. s., Conrad, 1849, pl. xvii, figs. 7, 8	723

	Page.
Donax? protexta, n. s., Conrad, 1849, pl. xvii, fig. 9	723–724
Venus bisecta, n. s., Conrad, 1849, pl. xvii, figs. 10, 10 *a*	724
Venus angustifrons, n. s., Conrad, 1849, pl. xvii, fig. 11	724
Venus lamellifera, n. s., Conrad, 1849, pl. xvii, figs. 12, 12 *a*	724
Venus brevilineata, n. s., Conrad, 1849, pl. xvii, fig. 13	724
Venus ——, sp., Conrad, 1849, pl. xviii, figs. 1, 1 *a*	724
Lupina acutilineata, n. s., Conrad, 1849, pl. xviii, figs. 2, 2 *a*, *b*	725
Tellina arctata, n. s., Conrad, 1849, pl. xviii, figs. 3, 3 *a*	725
Tellina emacerata, n. s., Conrad, 1849, pl. xviii, fig. 4	725
Tellina albaria, n. s., Conrad, 1849, pl. xviii, fig. 5	725
Tellina nasuta, n. s., Conrad, 1849	725
Tellina bitruncata, n. s., Conrad, 1849	725
Nucula divaricata, n. s., Conrad, 1849, pl. xviii, figs. 6, 6 *a*	725–726
Nucula impressa, n. s., Conrad, 1849, pl. xviii, figs. 7 *a–c*	726
Pectunculus patulus, n. s., Conrad, 1849, pl. xviii, figs. 8, 8 *a*	726
Pectunculus nitens, n. s., Conrad, 1849, pl. xviii, figs. 9 *a*, *b*	726
Arca devincta, n. s., Conrad, 1849, pl. xviii, figs. 10 *a*	726
Arca ——, Conrad, 1849, pl. xviii, figs. 11 *a*, *b*	726
Cardita subtenta, n. s., Conrad, 1849, pl. xviii, figs. 12, 12 *a*	726
Pecten propatulus, n. s., Conrad, 1849, pl. xviii, figs. 13, 13 *a*	726
Terebratula nitens, n. s., Conrad, 1849, pl. xix, figs. 1, 1 *a*	726–727
——? Conrad, 1849, pl. xix, fig. 2	727
Dolium petrosum, n. s., Conrad, 1849, pl. xix, figs. 3 *a*, *b*, 4 *a*, *b*, and 5 *a*, *b*	727
Sigaretus scopulosus, n. s., Conrad, 1849, pl. xix, figs. 6, 6 *a–d*	727
Natica saxea, n. s., Conrad, 1849, pl. xix, figs. 7 *a*, *b*	727
Bulla petrosa, n. s., Conrad, 1849, pl. xix, fig. 8	727
Orepidula præcepta, n. s., Conrad, 1849, pl. xix, figs. 9 *a*, and 10 *a*, *b*	727
Orepidula ——? Conrad, 1849, pl. xix, figs. 11 *a*, *b*	727
Rostellaria indurata, n. s., Conrad, 1849, pl. xix, fig. 12	727–728
Cerithium mediale, n. s., Conrad, 1849, pl. xx, figs. 1 *a*	728
Buccinum? devinctum, n. s., Conrad, 1849, pl. xx, figs. 2, 2 *a*	728
Fusus geniculus, n. s., Conrad, 1849, pl. xx, fig. 3	728
Fusus corpulentus, n. s., Conrad, 1849, pl. xx, fig. 4	728
Nautilus angustatus, n. s., Conrad, 1849, pl. xx, figs. 5, 6	728
Teredo substriata, pl. xx, figs. 7 *a*, *b*	728

The figures from 8 to 13, inclusive, on pl. xx, representing species from Astoria, are given of natural size, without names.

The plates were destroyed by fire, but about a dozen photographic copies of them have been taken by the U. S. Geological Survey.

3.

CONRAD, T. A. Description of the Fossils of Syria, collected in the Palestine expedition. <Official Rep. of the U. S. Exp. to explore the Dead Sea and the river Jordan. Sec. vi, Paleontological Report, pp. 209–235 [pls. i–xvi]. Baltimore, 1852.

The plates are numbered in a very irregular manner.

	Page.
Echinodermata.	
Echinus, Lin., Lam	2 [illegible]
E. syriacus, n. s., Conrad, 1852, pl. i, fig. 1, and pl. xxii, fig. 127	[illegible]
Holaster, Agassiz	[illegible]
H. syriacus, n. s., Conrad, 1852, pl. i, fig. 2	[illegible]
Cidaris, Lam	[illegible]
Spines of *Cidaris*, Conrad, 1852, pl. i, figs. 3–5	[illegible]
Testacea.	
Bivalves.	
Ostrea, Lin., Lam	212
O. virgata, Goldfuss, Nyst., pl. i, figs. 6–8	212
O. syriaca, n. s., Conrad, 1852, pl. ii, fig. 12	212
O. linguloides, n. s., Conrad, 1852, pl. ii, fig. 13	213
O. scapha, Rœmer, pl. xv, figs. 78, 79	213
Exogyra, Say	213
Ostrea boussingaultii, d'Orbigny	213
E. boussingaultii, d'Orbigny, pl. i, fig. 9, and pl. ii, figs. 10, 11	213

	Page.
Pecten, Gault., Lam.	213
Pecten, ——, Conrad, 1852	213
Nucula, Lam.	213
N. submucronata, n. s., Conrad, 1852, pl. ii, fig. 14	213
N. parallela, n. s., Conrad, 1852, pl. ii, fig. 15	214
N. syriaca, n. s., Conrad, 1852, pl. iii, fig. 16	214
N. myiformis, n. s., Conrad, 1852, pl. iii, fig. 17	214
N. perobliqua, n. s., Conrad, pl. iii, fig. 18	214
Trigonia, Brug	214
T. syriaca, n. s., Conrad, 1852, pl. iii, figs. 19–23	214
T. alta, n. s., Conrad, 1852, pl. iv, fig. 24	214
T. cuneiformis, n. s., Conrad, 1852, pl. iii, fig. 22	214–215
Isocardia, Lam.	215
I. crenulata, n. s., Conrad, 1852, pl. iv, fig. 26	215
Astarte, Sow.	215
A. syriaca, n. s., Conrad, 1852, pl. iv, fig. 25	215
A. orientalis, n. s., Conrad, 1852, pl. iv, fig. 27	215
A. pervetus, n. s., Conrad, 1852, pl. iv, fig. 28	215
A. engonata, n. s., Conrad, 1852, pl. iv, fig. 29	215
A. arctata, n. s., Conrad, 1852, pl. xx, fig. 119	215
Arca, Lin.	215
A. syriaca, n. s., Conrad, 1852, pl. v, fig. 30	215
A. brevifrons, n. s., Conrad, 1852, pl. v, fig. 31	215
A. indurata, n. s., Conrad, 1852, pl. v, fig. 33	216
A. orientalis, n. s., Conrad, 1852, pl. v, fig. 36	216
A. declivis, n. s., Conrad, 1852, pl. v, fig. 32	216
A. subrotunda, n. s., Conrad, 1852, pl. v, fig. 34	216
A. acclivis, n. s., Conrad, 1852, pl. v, fig. 35	216
Corbula, Brug.	216
C. congesta, n. s., Conrad, 1852, pl. v, fig. 37, and pl. xxii, fig. 130	216
Cardium, Lin., Lam.	219
C. biseriatum, n. s., Conrad, 1852, pl. vi, figs. 38–40	216–217
C. crebriechinatum, n. s., Conrad, 1852, pl. vi, figs. 41–43, and pl. xv, fig. 77; Appendix, pl. ii, fig. 16	217
C. syriacum, n. s., Conrad, 1852, pl. vii, fig. 45	217
C. hermonense, n. s., Conrad, 1852, pl. xxii, fig. 129	217
Ordium ? Conrad, 1852, pl. xv, fig. 76	217
Pholadomya, Sow.	217
P. decisa, n. s., Conrad, 1852, pl. vii, fig. 44	217
Panopæa, Ménard	217
P. pecterosa, n. s., Conrad, 1852, pl. vii, fig. 46	217
Inoceramus, Sow.	218
I. lynchii, n. s., Conrad, 1852, pl. viii, fig. 47	218
Mactra, Lin., Lam.	218
M. petrosa, n. s., Conrad, 1852, pl. viii, fig. 48	218
M. pervetus, n. s., Conrad, 1852, pl. viii, fig. 49	218
M. arciformis, n. s., Conrad, 1852, pl. viii, fig. 50	218
M. syriaca, n. s., Conrad, pl. viii, fig. 51	218
Venus, Lin., Lam.	218
V. syriaca, n. s., Conrad, 1852, pl. ix, fig. 52	218
V. indurata, n. s., Conrad, 1852, pl. ix, fig. 53	219
Cytherea, Lam.	219
C. syriaca, n. s., Conrad, 1852, pl. ix, figs. 54–56	219
Lucina, Lam.	219
L. syriaca, n. s., Conrad, 1852, pl. x, fig. 57	219
L. ? subtruncata, n. s., Conrad, 1852, pl. xv, fig. 76	219
Tellina, Lin., Lam.	219
T. syriaca, n. s., Conrad, 1852, pl. x, figs. 59–61	219
T. obruta, n. s., Conrad, 1852, pl. x, fig. 58	219
Orbicula ? Lam.	219
O. subobliqua, n. s., Conrad, 1852, pl. x, fig. 61½	219
Univalves:	
Chenopus, Phill.	220
C. turriculoides, n. s., Conrad, 1852, pl. x, fig. 62	220
C. induratus, n. s., Conrad, 1852, pl. xi, fig. 69	220

C. syriacus, n. s., Conrad, pl. xii, fig. 71 .....
Natica, Lam .....
N. inducata, n. s., Conrad, 1852, pl. xi, figs. 68 and 69 .....
N. syriaca, n. s., Conrad, 1852, pl. xii, fig. 70 .....
Pharus, Montf .....
P. syriacus, n. s., Conrad, 1852, pl. xi, fig. 66 .....
Turritella, Lam .....
T. syriaca, n. s., Conrad, 1852, pl. xv, fig. 75 22
T. magniscostata, n. s., Conrad, 1852, pl. x, fig. 63–64 .....
T. peralveata, n. s., Conrad, 1852, pl. xx, fig. 120 .....
Nerinea, Defr. .....
N. syriaca, n. s., Conrad, 1852, pl. xii, fig. 72; pl. xi, fig. 67 .....
N. rhamdunensis, n. s., Conrad, 1852, pl. xxii, fig. 123 .....
Strombus, Lin., Lam. .....
S. parvatus, n. s., Conrad, 1852, pl. xiii, fig. 73 .....
Ammonites .....
A. syriacus, n. s., Conrad, 1852, pl. xiv, fig. 74 .....

ORGANIC REMAINS OF THE CHALK.

Astarte, Sow .....
A. undulosa, n. s., Conrad, 1852, pl. xvi, figs. 81, and 86; pl. xvii, figs. 88, 89, 90 .....
A. mastrensis, n. s., Conrad, pl. xvii, fig. 96 .....
Corbula, Lam. .....
C. sublineolata, n. s., Conrad, 1852, pl. xvi, fig. 83 .....
C. syriaca, n. s., Conrad, 1852, pl. xxi, fig. 126 .....
Opis, Defr. .....
O. undatus, n. s., Conrad, 1852, pl. xvii, fig. 87 .....
Nucula, Lam. .....
N. perovata, n. s., Conrad, 1852, pl. xvii, fig. 91 .....
N. orbiculoscata, n. s., Conrad, 1852, pl. xvii, fig. 92–93 .....
N. ——, Conrad, 1852, Appendix, pl. i, fig. 5 .....
N. perdita, n. s., Conrad, 1852, pl. xvii, fig. 95 .....
N. ——, Conrad, 1852, pl. xix, fig. 111 .....
Cucullæa, Lam. .....
C. subrotunda, n. s., Conrad, 1852, pl. xvii, fig. 94 .....
C. lintea, n. s., Conrad, 1852, pl. xvii, fig. 95 .....
C. parallela, n. s., Conrad, 1852, pl. xvii, fig. 96 .....
Arca, Lin. .....
A. subformis, n. s., Conrad, 1852, pl. xvii, fig. 97 .....
Crassatella, Lam. .....
C. syriaca, n. s., Conrad, 1852, pl. xvii, fig. 100 22
Lithodomus, Cuv. .....
L. cretaceus, n. s., Conrad, 1852, pl. xvii, fig. 101 .....
Gryphæa, Lam. .....
G. cæpuloides, n. s., Conrad, 1852, pl. xviii, figs. 103 and 104 .....
G. vesicularis, Brown, pl. xviii, fig. 105 .....
Exogyra, Say .....
E. denseta, n. s., Conrad, pl. xviii, fig. 102 .....
E. denseta, var., Conrad, 1852, pl. xviii, fig. 106 .....
Avicula, Lam. .....
A. samariensis, n. s., Conrad, 1852, pl. xix, fig. 107 .....
Pecten, Lin., Lam. .....
P. delumbis, n. s., Conrad, 1852, pl. xix, fig. 110, and Appendix, pl. i, fig. 4 .....
P. obrutus, n. s., Conrad, 1852, pl. xix, fig. 114 .....
Cardium, Lin., Lam. .....
C. bellum, n. s., Conrad, 1852, Appendix, pl. i, fig. 3 .....
C. ovulum, n. s., Conrad, 1852, pl. xix, fig. 108 .....
Astarte, Sow. .....
A. lintea, n. s., Conrad, 1852, pl. xix, fig. 109 .....
A. sublineolata, n. s., Conrad, pl. xix, fig. 112 .....
Venus, Lin., Lam. .....
V. peroculis, n. s., Conrad, Appendix, pl. i, fig. 2 .....
Inoceramus, Sow. .....
I. arvitus, n. s., Conrad, 1852, pl. xix, fig. 113 .....
Lucina, Lam. .....

Page.

L. safadensis, n. s., Conrad, 1852, pl. ix, fig. 115 226
Terebratula, Lam. 226
T. hermonensis, n. s., Conrad, 1852, pl. xx, fig. 123 226
Univalves:
Fusus, Lam. 226
F. ellerii, n. s., Conrad, 1852, pl. xvi, fig. 82 226
Chenopus, Phillipi 226
Chenopus, Conrad, 1852 226
Hippurites, Lam. 226
H. syriacus, n. s., Conrad, 1852, pl. xvi, fig. 84 226
Nerinea, Defr. 227
N. cretacea, n. s., Conrad, 1852, pl. xvi, fig. 85 227
Anoyloceras, d'Orbigny 227
A. safadensis, n. s., Conrad, 1852, pl. xx, figs. 117–118 227
Baculites, Lam. 227
B. syriacus, n. s., Conrad, 1852, pl. xx, fig. 121 227
B ——, Conrad, 1852, pl. xx, fig. 122 227
Ammonites, Brug. 227
A. safadensis, n. s., Conrad, 1852, pl. xxi, fig. 124 227
Nummulites 227
N. arbiensis, n. s., Conrad, 1852, pl. xxii, fig. 127 227
Dentalium, Lin. 228
D. cretaceum, n. s., Conrad, 1852, Appendix, pl. i, fig. 1 228
Echinodermata 228
Echinus, Lin. 228
E. kerakensis, n. s., Conrad, 1852, pl. xix, fig. 116 228

APPENDIX.

JURASSIC FORMS.

Bivalves:
Janira, Shum 230
J. syriaca, n. s., Conrad, 1852, pl. i, fig. 6 230
Ostrea, Lin., Lam. 230
O. corticosa, n. s., Conrad, 1852, pl. i, fig. 7 230
O. virgata ? n. s., Conrad, pl. i, fig. 8 230
Opis, Defr. 231
O. equalis, n. s., Conrad, 1852, pl. ii, fig. 9 231
O. orientalis, n. s., Conrad, 1852, pl. ii, fig. 10 231
O. obrutus, n. s., Conrad, 1852, pl. ii, fig. 12 231
Astarte, Sow. 231
A. lucinoides, n. s., Conrad, 1852, pl. ii, fig. 11 231
A. subcordata, n. s., Conrad, 1852, pl. ii, fig. 13 231
Inoceramus, Sow. 231
I. syriacus, n. s., Conrad, 1852, pl. ii, fig. 14 231
I. elevatus, n. s., Conrad, 1852, pl. ii, fig. 15 231
Pholadomya, Sow. 231
P. syriaca, n. s., Conrad, 1852, pl. ii, fig. 17 231
Cardium, Lin. 231
C. crebriechinatum, n. s., Conrad, 1852, pl. ii, fig. 16 231
Arca, Lin. 231
A. longa, n. s., Conrad, 1852, pl. iii, fig. 18 231
A. bhamdunensis, n. s., Conrad, 1852, pl. iii, fig. 19 232
A. cuneus, n. s., Conrad, 1852, pl. iii, fig. 22 232
Cucullæa, Lam. 232
C. opiformis, n. s., Conrad, 1852, pl. iii, fig. 21 232
Nucula, Lam 232
N. abrupta, n. s., Conrad, 1852, pl. iii, fig. 20 232
N. ? obtenta, n. s., Conrad, 1852, pl. iii, fig. 23 232
Tellina, Lin. 232
T. syriaca ?, Conrad, 1852, pl. iii, fig. 25, and pl. x, figs. 59–61 232
Orbicula, Cuv 232
O. ? syriaca, n. s., Conrad, 1852, pl. iii, fig. 24 232
Trigonia, Brug 232
T. syriaca, n. s., Conrad, 1852, pl. iv, fig. 26 232

T. distans, n. s., Conrad, 1852, pl. iv, fig. 27.
Panopæa, Mén.
P. orientalis, n. s., Conrad, 1852, pl. iv, fig. 28.
Univalves:
Nerinea, Defrance
N. ? cochleaformis, n. s., Conrad, 1852, pl. iv, fig. 29
N. ——, Conrad, 1852, pl. iv, figs. 30, 31
N. ? orientalis, n. s., Conrad, 1852, pl. v, fig. 32
N. syriaca, n. s., Conrad, 1852, pl. v, figs. 33, 34, 35, 37, 38
N. abbreviata, n. s., Conrad, 1862, pl. v, fig. 36
N. ——, Conrad, 1852
Actæonella, d'Orb.
A. syriaca, n. s., Conrad, 1852, pl. v, fig. 40
Cerithium, Adans., Lam.
C. bilineatum, n. s., Conrad, 1852, pl. v, fig. 29
Natica, Lam.
N. orientalis, n. s., Conrad, 1852, pl. v, fig. 41
Turritella, Lam.
T. syriaca, n. s., Conrad, 1852, pl. v, fig. 42
Cancellaria, Lam.
C. petrosa, n. s., Conrad, 1852, pl. v, fig. 43
Bivalves:
Lithodomus, Cuv.
L. stamineus, n. s., Conrad, 1852, pl. v, fig. 44
Cardium, Lin.
C. biseriatum, n. s., Conrad, 1852, pl. v, fig. 45
Univalves:
Ammonites
A. libanensis, n. s., Conrad, 1852, pl. vi, fig. 46
Hippurites, Lam.
H. liratus, n. s., Conrad, 1852, pl. vii, figs. 47, 48
H. plicatus, n. s., Conrad, 1852, pl. vii, fig. 49
Natica, Lam.
N. ? scalaris, n. s., Conrad, 1852, pl. vii, fig. 50
Chenopus
C. ——, Conrad, pl. viii, figs. 51, 52
Bivalves:
Corbula, Lam.
C. aleihensis, n. s., Conrad, 1852, pl. viii, fig. 53
Orbicula, Lam.
Orbicula ? ——, Conrad, 1852, pl. viii, fig. 55
Echinodermata
Echinus, Lin.
E. libanensis, n. s., Conrad, 1852, pl. viii, fig. 54
E. bullatus, n. s., Conrad, 1852, pl. viii, fig. 56

4.

CONRAD, T. A. Report on the fossil shells collected in California by William Blake, geologist of the expedition under the command of Lieut. R. S. William United States Topographical Engineers. <Reports of Explorations and Surv from the Mississippi River to the Pacific Ocean. Appendix to the Prelimin Geological Report of William P. Blake. Paleontology article I, pp. 5–20, 8 House Document 129, Washington (1855).

CATALOGUE.

Eocene
Miocene and recent formations

DESCRIPTIONS OF FOSSIL SHELLS FROM THE EOCENE AND MIOCENE FORMATIONS OF CALIFORNIA.

Eocene.

Cardium, Lin.
C. linteum, n. s., Conrad, 1855, pl. 1, fig. 1

	Page.
Dosinia, Scopoli	9
D. alta, n. s., Conrad, 1855, pl. i, fig. 2	9
Meretrix, Lam.—*Cytherea*, Lam.	9
M. uvasana, n. s., Conrad, 1855, pl. i, fig. 3	9
M. californiana, n. s., Conrad, 1855, pl. i, fig. 4	9
Crassatella, Lam.	9
C. uvasana, n. s., Conrad, 1855, pl. i, fig. 5	9
C. alta, n. s., Conrad, 1855	9
Mytilus, Lin.	10
M. humerus, n. s., Conrad, 1855, pl. i, fig. 10	10
Cardita, Brug.	10
C. planicosta, n. s., Conrad, pl. i, fig. 6	10
Natica, Adanson	10
N. astites ?, Conrad, 1833, pl. i, fig. 7	10
N. gibbosa and *semilunata*, Lea	10
N. alveata, n. s., Conrad, 1855, pl. i, figs. 8, 8 *a*	10
Turritella, Lam.	10
T. uvasana, n. s., Conrad, 1855, pl. i, fig. 12	10–11
Voluta[l]ithes, Swains. [*s*]	11
V. californiana. n. s., Conrad, 1855, pl. i, fig. 9	11
Busycon, ?	11
B. ? blakei, n. s., Conrad, 1855, pl. i, fig. 13	11
Clavatula, ? Swains.	11
C. ? californica, n. s., Conrad, 1855, pl. i, fig. 11	11

FOSSILS OF THE MIOCENE AND RECENT FORMATIONS OF CALIFORNIA.

Cardium, Lin.	11
C. modestum, n. s., Conrad, 1855, pl. ii, fig. 15	11
Nuculana, Lam.	11
N. decisa, n. s., Conrad, 1855, pl. ii, fig. 19	11–12
Corbula	12
C. diegoana, n. s., Conrad, 1855, pl. ii, fig. 16	12
Meretrix, Lam.	12
M. uniomeris, n. s., Conrad, 1855, pl. ii, fig. 20	12
M. decisa, n. s., Conrad, 1855, pl. ii, fig. 27	12
M. tularana, n. s., Conrad, 1855, pl. ii, figs. 22, 22 *a*	12
Tellina, Lin	12
T. diegoana, n. s., Conrad, 1855, pl. ii, fig. 28	12
T. congesta, n. s., Conrad, 1855, pl. ii, figs. 14, 18, 21	12–13
T. pedroana, n. s., Conrad, 1855, pl. ii, fig. 17	13
Area, Lin	13
A. microdonta, n. s., Conrad, 1855, pl. ii, fig. 29	13
Tapes	13
T. diversum, Sow., pl. ii, figs. 24, *a*, and 26	13
Saxicava Fleur de Bell	13
S. abrupta, n. s., Conrad, 1855, pl. ii, figs. 25, 25 *a*	13
Petricola, Lam.	
P. pedroana, n. s., Conrad, pl. ii, fig. 23	13–14
Schizothærus, Conrad	14
S. nuttalli, n. s., Conrad, 1855, pl. iii, figs. 33, 33 *a*	14
Lutraria ?, Lam.	14
L. traski, n. s., Conrad, 1855, pl. iii, fig. 30	14
Mactra, Lin.	14
M. diegoana, n. s., Conrad, 1855, pl. iv, fig. 35	14
Modiola, Lam.	14
M. contracta, n. s., Conrad, 1855, pl. iv, fig. 35	14
Mytilus, Lin.	15
M. pedroanus, n. s., Conrad, 1855, pl. —, fig. 40	15
Pecten, Lin	15
P. deserti, n. s., Conrad, 1855, pl. —, fig. 41	15
Anomia, Lin.	15
A. subcostata, n. s., Conrad, 1855, pl. —, fig. 34	15
Ostrea, Lin.	15
O. vespertina, Conrad, 1855, pl. —, fig. 36–38	15

O. heermani, Conrad
Penitella
P. spelæum, n. s., Conrad, 1855, pl. —, figs. 43, 43 *a*, *b*
Fissurella, Lam.
F. crenulata, Sow., pl. —, fig. 44
Crepidula, Lam., *Crypta*, Humph.
C. princeps, n. s., Conrad, 1855, pl. —, fig. 53
Narica
N. diegoana, n. s., Conrad, 1855, pl. —, fig. 39
Trochita, Schum.
T. diegoana, n. s., Conrad, 1855, pl. —, fig. 42
Crucibulum, Shum
C. spinosum, n. s., Conrad, 1855, pl. —, fig. 46
Nassa, Lam.
N. int[er]striata, n. s., Conrad, 1855, pl. —, fig. 49
N. pedroana, n. s., Conrad, 1855, pl. —, fig. 48
Strephona, Browne, *Oliva*, Lam.
S. pedroana, n. s., Conrad, 1855, pl. —, fig. 51
Littorina, Ferr.
L. pedroana, n. s., Conrad, 1855, pl. —, fig. 50
Stramonita, Shum., *Purpura*, Lam.
S. petrosa, n. s., Conrad, 1855, pl. —, fig. 47, 47 *a*

TERTIARY SHELLS OF THE ISTHMUS OF DARIEN.

Miocene?

***Gratelupia?* Desmoulins**
***G. macropsis*, n. s., Conrad, 1855, pl. —, fig. 54**
Mactra
***M. dariena*, n. s., Conrad, 1855, pl. —, fig. 55**
Tellina, Lin.
***T. dariena*, n. s., Conrad, 1855, pl. —, fig. 58**

MIOCENE FOSSILS FROM OCOYA CREEK.

Natica
N. ocoyana, n. s., Conrad, 1855, pl. vi, fig. 57
N. geniculata, n. s., Conrad, 1855, pl. vi, fig. 67
Bulla
B. jugularis, n. s., Conrad, 1855, pl. vi, figs. 62, 62 *a*, *b*
Pleurotoma
P. transmontana, n. s., Conrad, 1855, pl. vi, fig. 69
P. ocoyana, n. s., Conrad, 1855, pl. vi, fig. 71
Sycotopus
S. ocoyanus, n. s., Conrad, 1855, pl. vi, fig. 72
Turritella
T. ocoyana, n. s., Conrad, 1855, pl. vii, figs. 73, 73 *a*, 73 *b*
Colus
C. arctatus, n. s., Conrad, 1855, pl. vii, fig. 76
Tellina
T. ocoyana, n. s., Conrad, 1855, pl. vii, fig. 75
Pecten
P. nevadanus, n. s., Conrad, 1855, pl. vii, fig. 77
P. catilliformis, n. s., Conrad, 1855, pl. viii, fig. 83

5.

CONRAD, T. A. Descriptions of the Fossil Shells. <Reports of Expls. & Surv. from the Mississippi River to the Pacific Ocean. Vol. v, part ii, appendix, article ii, pp. 317–329, pls. ii–ix. Washington, 1856.

Page.
Catalogue 318-320

DESCRIPTIONS OF FOSSIL SHELLS FROM THE EOCENE AND MIOCENE FORMATIONS OF CALIFORNIA.

Eocene.

Cardium, Lin 320
C. linteum, Conrad, 1855, pl. ii, fig. 1 320
Dentalia, Scopoli 320

Page.

D. alta, Conrad, 1855, pl. ii, fig. 2 320
Meretrix, Lam.—*Cytherea*, Lam 320
M. uvasana, Conrad, 1855, pl. ii, fig. 3 320
M. californiana, Conrad, 1855, pl. ii, fig. 4 320
Crassatella, Lam. 320
C. uvasana, Conrad, 1855, pl. ii, fig. 5 320–321
C. alta, Conrad, 1855 321
Mytilus, Lin. 321
M. humerus, Conrad, 1855, pl. ii, fig. 10 321
Cardita, Brug. 321
C. planicosta, Conrad, 1855, pl. ii, fig. 6 321
Natica, Adamson 321
N. ætites? Conrad, 1833, pl. ii, fig. 7 321
N. gibbosa and *semilunata*, Lea, 1833 321
N. alveata, Conrad, pl. ii, figs. 8, 8 *a* 321
Turritella, Lam. 321
T. uvasana, Conrad, 1855, pl. ii, fig. 12 321–322
Voluta[l]*ithes*. Swains. 322
V. californiana, Conrad, 1855, pl. ii, fig. 9 322
Busycon? 322
B.? blaksi, Conrad, 1855, pl. ii, fig. 13 322
Clavatula? Swains. 322
C.? californica, Conrad, 1855, pl. ii, fig. 11 322

FOSSILS OF THE MIOCENE AND RECENT FORMATIONS OF CALIFORNIA.

Cardium, Lin. 322
C. modestum, Conrad, 1855, pl. iii, fig. 15 322
Nucula, Lam. 322
N. decisa, Conrad, 1855, pl. iii, fig. 19 322
Corbula 322
C. diegoana, Conrad, 1855, pl. iii, fig. 16 322–323
Meretrix, Lam. 323
M. uniomeris, Conrad, 1855, pl. iii, fig. 20 323
M. decisa, Conrad, 1855, pl. iii, fig. 27 323
M. tularana, Conrad, 1855, pl. iii, fig. 22, 22 *a* 323
Tellina, Lin. 323
T. diegoana, Conrad, 1855, pl. iii, fig. 28 323
T. congesta, Conrad, 1855, pl. iii, figs. 14, 18, 21, 21 *a* 323
T. pedroana, Conrad, 1855, pl. iii, fig. 17 323
Arca, Lin. 323
A. microdonta, Conrad, 1855, pl. iii, fig. 29 323–324
Tapes 324
T. diversum, Sow., pl. iv, figs. 31, 32 *a*, *b* 324
Saxicava, Fleur de Bell 324
S. abrupta, Conrad, 1855, pl. iii, figs. 25, 25 *a* 324
Petricola, Lam. 324
P. pedroana, Conrad, 1855, pl. iii, fig. 24 324
Schizothærus, Conrad 324
S. nuttalli, Conrad, 1855, pl. iv, figs. 23, 33 *a* 324
Lutraria? Lam 324
L. trasket, Conrad, 1855, pl. iii, fig. 23 324–325
Mactra, Lin. 325
M. diegoana, Conrad, 1853, pl. v, fig. 45 325
Modiola, Lam. 325
M. contracta, Conrad, pl. v, fig. 35 325
Mytilus, Lin. 325
M. pedroanus, Conrad, 1855, pl. v, fig. 40 325
Pecten, Lin. 325
P. deserti, Conrad, 1855, pl. v, fig. 41 325
Anomia 325
A. subcostata, Conrad, 1855, pl. v, fig. 34 325
Ostrea, Lin. 325
O. vespertina, Conrad, 1855, pl. v, figs. 36–38 325–326
O. hermanni, Conrad, 1855, pl. —, figs. — 326

Page.
Penitella 326
P. spelæa, Conrad, 1855, pl. v, figs. 43, 43 *a*, *b* 326
Fissurella, Lam. 326
F. crenulata, Sow., pl. v, fig. 44 326
Crepidula, Lam., *Orypta*, Humph. 326
C. princeps, Conrad, 1855, pl. vi, figs. 52, 52 *a* 326
Narica 326
N. diegoana, Conrad, 1855, pl. v, fig. 39 326
Trochita, Shum. 327
T. diegoana, Conrad, 1855, pl. v, fig. 42 327
Crucibulum, Shum. 327
C. spinosum, Conrad, 1835, pl. v, figs. 46, 46 *a* 327
Nassa, Lam. 327
N. interstriata, Conrad, 1855, pl. vi, fig. 49 327
N. pedroana, Conrad, 1855, pl. vi, fig. 48 327
Strephona, Browne, *Oliva*, Lam. 327
S. pedroana, Conrad, 1855, pl. vi, fig. 51 327
Littorina, Ferr. 327
L. pedroana, Conrad, 1855, pl. vi, fig. 50 327
Stramonita, Shum., *Purpura*, Lam 327
S. petrosa, Conrad, 1855, pl. vi, figs. 47, 47 *a* 327

TERTIARY SHELLS OF THE ISTHMUS OF DARIEN.

Miocene.

Gratelupia? Desmoulins.
G.? mactropsis, Conrad, 1855, pl. vi, fig. 54 32
Meretrix 32
M. dariena, Conrad, 1855, pl. vi, fig. 55 32
Tellina, Lin. 32
T. dariena, Conrad, 1855, pl. vi, fig. 53 32

MIOCENE FOSSILS FROM OCOYA CREEK.

Natica 32
N. ocoyana, Conrad, 1855, pl. vii, figs. 57, 57 *a* 32
N. geniculata, Conrad, 1855, pl. vii, fig. 67 32
Bulla 32
B. jugularis, Conrad, 1856, pl. vii, figs. 62, 62 *a*, *b* 32
Pleurotoma 32
P. transmontana, Conrad, 1855, pl. vi, fig. 69 328-32
Syctopus 32
S. ocoyanus, Conrad, 1855, pl. vii, figs. 72, 72 *a* 32
Turritella 32
T. ocoyana, Conrad, 1855, pl. viii, figs. 73, 73 *a*, *b* 32
Colus 32
C. arctatus, Conrad, 1855, pl. viii, fig. 76 32
Tellina 32
T. ocoyana, Conrad, 1855, pl. viii, figs. 75, 75 *a* 32
Pecten 32
P. nevadanus, Conrad, 1855, pl. viii, fig. 77 32
P. catilliformis, Conrad, 1855, pl. ix, fig. 83 32

6.

CONRAD, T. A. Descriptions of one Tertiary and eight New Cretaceous Fossils from Texas, in the Collection of Major Emory. <Proc. Acad. Nat. Sci. Philadelphia, vol. vii, pp. 268-269, February, 1855. Philadelphia, 1856.

Page.
Rostellites, Conrad 268
R. texanus, n. s., Conrad, 1856 268
Turritella, Lam. 268

	Page.
T. irrorata, Conrad, n. s., 1856	268
Caprina	268
C. planata, n. s., Conrad, 1856	268
C. occidentalis, n. s., Conrad, 1856	268
Neithea, Drouet	269
N. occidentalis, n. s., Conrad, 1856	269
Mactra, Lin.	269
M. texana, n. s. Conrad, 1856	269
Exogyra, Say	269
E. fragosa, n. s., Conrad, 1856	269
E. fimbriata, n. s., Conrad, 1856	296
Tertiary species:	
Ostrea contracta, n. s., Conrad, 1856	269

7.

RAD, T. A. Descriptions of three new genera; twenty-three new species of Middle Tertiary Fossils from California, and one from Texas. <Proc. Acad. Nat. Sci. Philadelphia, vol. viii, pp. 312–316, 1856. Philadelphia, 1857.

	Page.
Janira, Shum.	312
J. bella, n. s., Conrad, 1857	312–313
Pallium, Klein	313
P. estrellanum, n. s., Conrad, 1857	313
P. crassicardo, n. s., Conrad, 1857	313
Pecten, Lin.	313
P. meekii, n. s., Conrad, 1857	313
P. altiplectus, n. s., Conrad, 1857	313
Pachydesma, Conrad	313
P. inezana, n. s., Conrad, 1857	313
Mulinia, Gray	313
M. densata, n. s., Conrad, 1857	313
Thracia, Leach	313
T. mactropis, n. s., Conrad, 1857	313
Mya, Lin.	313
M. montereyana, n. s., Conrad, 1857	313–314
Arca, Lin.	314
A. canalis, n. s., Conrad, 1857	314
A. trilineata, n. s., Conrad, 1857	314
A. congesta, n. s., Conrad, 1857	314
Axinæa, Poli, *Pectunculus*, Lam	314
Axinæa barbarensis, n. s., Conrad, 1857	314
Arcopagia	314
A. medialis, n. s., Conrad, 1857	314
Topes, Sowerby	314
T. lineatum, n. s., Conrad, 1857	314
Oryptomya, Conrad	314
C. ovalis, n. s., Conrad, 1857	314
Cyclas, Klein, *Lucina*, Lam.	314
Cyclas tetrica, n. s., Conrad, 1857	314
Spondylus estrallensis, n. s., Conrad, 1857	315
Dosinia, Scopoli	315
D. longula, n. s., Conrad, 1857	315
D. alta, n. s., Conrad, 1857	315
Lutraria	315
L. transmontana, n. s., Conrad. 1857	315
Schizopyga, n. g., Conrad, 1857	315
S. californiana, n. s., Conrad, 1857	315
Temiscoma, n. g., Conrad, 1857	315
T. gregaria, n. s., Conrad, 1857	315

ECHINODERMS.

Page.
Astrodapsis, n. g., Conrad, 1857 215
A. antiselli, n. s., Conrad, 1857 215
Mellita tenuis, n. s., Conrad, 1857 216

8.

CONRAD, T. A. Description of the Tertiary Fossils collected on the Survey. <Reports of Explorations and Surveys from the Mississippi River to the Pacific Ocean. Vol. vi, part ii, No. 2, pp. 69–73, pls. ii–v. Washington, 1857.

CALIFORNIA FOSSILS.

Univalves. Page.
Schizopyga, n. s., Conrad, 1857 69
S. californiana, n. s., Conrad, 1857, pl. ii, fig. 1 69
Bivalves.
Cryptomya, Conrad, 1857 69
C. ovalis, Conrad, 1856, pl. ii, fig. 2 69
Thracia, Leach 69
T. mactropis, Conrad, 1856, pl. ii, fig. 3 69-70
Mya, Lin. 70
M. montereyana, Conrad, 1856, pl. ii, fig. 4 70
M.? subsinuata, n. s., Conrad, 1857, pl. ii, fig. 5 70
Arcopagia, Leach 70
A. medialis, Conrad, 1856, pl. ii, fig. 6 70
Tapes, Sowerby 70
T. tantostum, Conrad, 1856, pl. ii, fig. 7 70
Area, Lin. 70
A. canalis, Conrad, 1856, pl. ii, fig. 8 70
A. trilineata, Conrad, 1856, pl. ii, fig. 9 70
A. congesta, Conrad, 1856, pl. ii, fig. 10 70-71
Axinæa, Poli, *Pectunculus*, Lam 71
A. barbarensis, n. s., Conrad, 1857, pl. iii, fig. 11 71
Mulinia, Gray 71
M. densata, Conrad, 1856, pl. iii, fig. 12 71
Dosinia, Scopoli 71
D. longula, Conrad, 1856 71
D. alta, Conrad, 1856, pl. iii, figs. 13 *a*, *b* 71
Pecten, Lin. 71
P. pabloensis, n. s., Conrad, 1857, pl. iii, fig. 14 71
Pallium, Klein 71
P. estrellanum, Conrad, 1856, pl. iii, fig. 15 71
Janira, Shum. 71
J. bella, Conrad, 1856, pl. *b* i, fig. 16 71-72
Ostrea, Linn. 72
O. titan, Conrad, 1855, pl. iv, fig. 17, and pl. v, fig. 17 *a* 72

FOSSILS OF GATUN, ISTHMUS OF DARIEN.

Malea, Valenc. 72
M. ringens, n. s., Conrad, 1857, pl. v, fig. 22 72
Turritella, Lam. 72
T. altilira, n. s., Conrad, 1857, pl. v, fig. 19 72
T. gatunensis, n. s., Conrad, 1857, pl. v, fig. 20 72
Triton, Lam. 72
Cytherea? Lam. 72
C.? (Meretrix) dariena, ? n. s., Conrad, 1857, pl. v, fig. 21 72
Tamiosoma, n. g., Conrad, 1857 72
T. gregaria, n. s., Conrad, 1857, pl. iv, fig. 18 72-73
Pandora, Lam. 73
P. bilirata, Conrad, 1855, pl. v, fig. 25 73
Cardita, Brug. 73
C. occidentalis, Conrad, 1855, pl. v, fig. 24 73
Diadora, Gray 73
D. crucibuliformis, Conrad, 1856, pl. v, fig. 23 73

9.

NRAD, T. A. Report on the Palæontology of the Survey. <Reports of Explorations and Surveys from the Mississippi River to the Pacific Ocean. Vol. vii, part iii, pp. 189–196, plates i–x. Washington, 1857.

	Page.
Hinnites, Defrance	190
H. crassa, n. s., Conrad, 1857, pl. ii, figs. 1, 2	190
Pecten, Lin.	190
P. meekii, n. s., Conrad, 1857, pl. i, fig. 1	190
P. deserti, Conrad	190
P. discus, n. s., Conrad, 1857, pl. iii, fig. 1	190–191
P. magnolia, n. s., Conrad, 1857, pl. i, fig. 2	191
P. altiplicatus, n. s., Conrad, 1857, pl. iii, fig. 2	191
Pallium, Conrad	191
P. estrellanum, n. s., Conrad, 1857, pl. iii, figs. 3, 4	191
Spondylus, Rond., Lam.	191
S. estrellanus, n. s., Conrad, 1857, pl. i, fig. 3	191
Tapes? Mühlf.	192
T. montana, n. s., Conrad, 1857, pl. v, figs. 3, 5	192
T. inezensis, n. s., Conrad, 1857, pl. vii, fig. 1	192
Venus, Lin.	192
V. pajaroana, n. s., Conrad, 1857, pl. iv, figs. 1, 2	192
Arcopagia, Brown	192
A. unda, n. s., Conrad, 1857, pl. iv, figs. 3, 4	192
Cyclas, Klein, *Lucina*, Lam.	192
C. permacra, n. s., Conrad, 1857, pl. vii, fig. 4	192
C. estrellana, n. s., Conrad, 1857, pl. vi, fig. 6	192
Arca, Lin.	192
A. obispoana, n. s., Conrad, 1857, pl. v, fig. 1	192
Pachydesma, Conrad	193
P. inezana, n. s., Conrad, 1857, pl. v, figs. 2, 4	193
Crassatella, Lam.	193
C. collina, n. s., Conrad, 1857, pl. vi, figs. 1, 2	193
Ostrea, Lin.	193
O. subjecta, n. s., Conrad, 1857, pl. ii, fig. 3	193
O. panzana, n. s., Conrad, 1857, pl. ii, fig. 4	193
Dosinia Scopoli, *Asthemis* Poli	193
D. alta, n. s., Conrad, 1857, pl. —, fig. —	193
D. longula, n. s., Conrad, 1857, pl. vii, fig. 2	193–194
D. montana, n. s., Conrad, 1857, pl. vi, fig. 4	194
D. subobliqua, n. s., Conrad, 1857, pl. vi, fig. 5	194
Mytilus, Lin.	194
M. inezensis, n. s., Conrad, 1857, pl. viii, figs. 2, 3	194
Lutraria, Lam.	194
L. transmontana, n. s., Conrad, 1857, pl. v, fig. 6	194
Axinea, Sow., *Pectunculus*, Lam.	194
A. barbarensis, n. s., Conrad, 1857, pl. vi, fig. 3	194
Mactra?	194
M.? gabiotensis, n. s., Conrad, 1857, pl. vii, fig. 4	194
Glycimeris, Lam., *Panopœa*, Menard	194
G. estrellanus, n. s., Conrad, 1857, pl. vii, fig. 5	194
Perna, Lam.	195
P. montana, n. s., Conrad, 1857, pl. —, fig. —	195
Univalves.	
Trochita	195
T. costellata, n. s., Conrad, 1857, pl. vii, fig. 3	195
Turritella, Lam.	195
T. inezana, n. s., Conrad, 1857, pl. viii, fig. 4	195
T. varlata, n. s., Conrad, 1857, pl. viii, fig. 5	195
Natica	195
N. inezana, n. s., Conrad, 1857, pl. x, figs. 5, 6	195
Multivalves.	
Balanus estrellanus, n. s., Conrad, 1857, pl. viii, fig. 1	195
Echinoderm.	
Astrodapsis, Conrad	196
A. antiselli, n. s., Conrad, 1857, pl. x, figs. 1, 2	196

10.

CONRAD, T. A. Descriptions of Cretaceous and Tertiary fossils. <United States and Mexican Boundary Survey. Report of William H. Emory. Vol. i, part ii, pp. 141–174, pls. i–xxi. Washington, 1857.

	Page.
Eocene species	14
Cretaceous fossils from Oak Creek, Texas	14
Cretaceous fossils from between Rio San Pedro and Rio Puercos	14
Cretaceous fossils from between El Paso and Frontera	14
Cretaceous fossils from Leon Springs	14
Cretaceous fossils from Jacun, 3 miles below Laredo	14
Cretaceous fossils from Lepan Hills	1
Cretaceous ? fossils from Dry Creek, Mexico	1
Cretaceous fossils from various localities	1
Polypi:	
Turbinolia, Lam	
T. texana, n. s., Conrad, 1857, pl. ii, figs. 3 *a*, *b*	
Bivalves:	
Caprina, D'Orbigny	147
C. occidentalis, Conrad, pl. ii, figs. 1 *a–c*	147
C. planata, Conrad, pl. ii, figs. 2 *a*, *b*	147
Terebratula, Lhwyd., Lam	147
T. wacoensis, Roemer, pl. iii, fig. 1	147
T. choctawensis, Shumard	147
Trigonia, Lam	147
T. emoryi, Conrad, pl. iii, fig. 2 *a–c*	148
T. texana, n. s., Conrad, 1857, pl. iii, figs. 3 *a–c*	148
Mactra, Lin., Lam	148
M. texana, Conrad, pl. iv, figs. 1 *a*, *b*	148
Cucullæa, Lam	148
C. terminalis, n. s., Conrad, 1857, pl. iv, figs. 2 *a*, *b*	148
Arca, Lin	148
A. subelongata, n. s., Conrad, 1857, pl. vi, figs. 3 *a*, *b*	148
Arcopagia	149
A. texana, Roemer, pl. iv, figs. 3 *a*, *b*	149
Cardium, Lin., Lam	149
C. mediale, n. s., Conrad, 1857, pl. iv, figs. 4 *a*, *b*	149
C. congestum, n. s., Conrad, 1857, pl. vi, figs. 5 *a–d*	149
Subgenus *Protocardia*, Beyrich	149
C. (Protocardia) multistriatum, Shumard, pl. vi, figs. 4 *a–c*	149
C. (Protocardia) texanum, n. s., Conrad, 1857, pl. v, figs. 6 *a–c*	150
C. (Protocardia) filosum, n. s., Conrad, 1857, pl. vi, figs. 7 *a*, *b*	150
Cardita, Lam., Blainville	150
C. eminula, n. s., Conrad, 1857, pl. vi, fig. 8	150
Corbula	150
C. occidentalis, n. s., Conrad, 1857, pl. vi, fig. 9	150
Neithea, Drouet	150
N. occidentalis, Conrad, pl. v, figs. 1 *a*, *b*	150–151
N. texana, Roemer, sp., pl. v, figs. 2 *a*, *b*	151
Lima	151
L. wacoensis, Roemer, sp., pl. v, figs. 4 *a*, *b*	151
L. leonensis, n. s., Conrad, 1857, pl. v, figs. 3 *a–c*	151
Inoceramus, Sowerby	151
I confertim-annulatus, Rœmer, sp., pl. v, fig. 5	151
I. mytilopsis, n. s., Conrad, 1857, pl. v, figs. 6 *a*, *b*	152
I. texanus, n. s., Conrad, 1857, pl. v, fig. 7	152
I. crispii, Mantell, pl. v, fig. 8	152
Pholadomya, Sowerby	152
P. texana, n. s., Conrad, 1857, pl. xix, fig. 3	152
Astarte, Sowerby	152
A. texana, n. s., Conrad, 1857, pl. v, fig. 9	152
Cytherea, Lam	153
C. leonensis, n. s., Conrad, 1857, pl. vi, fig. 1	153
C. texana, n. s., Conrad, 1857, pl. vi, fig. 2	153
Plicatula, Lam	153

	Page.
P. incongrua, n. s., Conrad, 1857, pl. vi, figs. 10 *a*, *b*...	153
Exogyra, Say	153
E. aristina, Rœmer, pl. vii, figs. 1 *a–e*	153
E. fimbriata, Conrad, pl. vii, figs. 2 *a*, *b*	154
E. læviuscula, Rœmer, pl. vii, figs. 4 *a*, *b*	154
E. matheroniana, d'Orbigny, pl. viii, figs. 1 *a–c*, and pl. xi, figs. 1 *a*, *b*	154
E. costata var. Conrad, 1857, pl. viii, fig. 2	154
E. costata, Say, pl. ix, figs. 1 and 2, and pl. x, fig. 1, and pl. viii, fig. 3	154–155
E. fragosa, Conrad, pl. viii, figs. 2 *a*, *b*	155
Gryphæa, Lam	155
G. pitcheri, Morton, pl. vii, fig. 3, and pl. x, figs. 2 *a*, *b*	155
Ostrea, Linn	150
O. subspatulata, Lyell & Sowerby, pl. x, figs. 3 *a*, *b*	155–156
O. bella, n. s., Conrad, 1857, pl. x, figs. 4 *a*, *b*	156
O. lugubris, n. s., Conrad, 1857, pl. x, figs. 5 *a*, *b*	156
O. carinata, Lam., pl. x, fig. 6	156
O. vellicata, n. s., Conrad, 1857, pl. xi, figs. 2 *a*, *b*	156
O. robusta, n. s., Conrad, 1857, pl. xi, figs. 3 *a*, *b*	156–157
O. cortex, n. s., Conrad, 1857, pl. xi, figs. 4 *a–d*	157
O. multilirata, n. s , Conrad, 1857, pl. xii, figs. 1 *a–d*	157
dvalves:	
Natica, Lam	157
N. texana, n. s., Conrad, 1857, pl. xiii, figs. 1 *a*, *b*	157
N. collina, n. s., Conrad, 1857, pl. xiii, figs. 2 *a*, *b*	157
Rostellaria ? Lam	157
R. ? collina, n. s., Conrad, 1857, pl. xiii, figs. 3 *a*, *b*	157
R. ? collina [*texana*], n. s., Conrad, 1857, pl. xiii, figs. 4 *a*, *b*	158
Buccinopsis	158
B. parryi, n. s., Conrad, 1857, pl. xiii, figs. 5 *a*, *b*	158
Turritella, Lam	158
T. planilateris, n. s., Conrad, 1857, pl. xiv, figs. 1 *a*, *b*	158
Rostellites, Conrad	158
R. texana, Conrad, pl. xiv, figs. 2 *a*, *b*	158
Nerinea, Defrance	158
N. schottii, n. s., Conrad, 1857, pl. xiv, figs. 3 *a*, *b*	158–159
Nodosaria, Lam	159
N. texana, n. s., Conrad, 1857, pl. xiv, figs. 4 *a–c*	159
Ammonites, Lam	159
A. pleurisepta, n. s., Conrad, 1857, pl. xv, figs. 1 *a–c*	159
A. geniculatus, n. s., Conrad, 1857, pl. xv, figs. 2 *a*, *b*	159
A. texanus, Rœmer, pl. xvi, figs. 1 *a–d*	159–160
A. leonensis, n. s., Conrad, 1857, pl. xvi, figs. 2 *a*, *b*	160
TERTIARY FOSSILS.	
Ostrea, Lin	160
O. vespertina, Conrad, pl. xvii, figs. 1 *a–d*	160
O. veleniana, n. s., Conrad, 1857, pl. xvii, figs. 2 *a*, *b*	160
O. contracta, Conrad, pl. xviii, *a–d*	160–161
Anomia, Lin	161
A. subcostata, Conrad, pl. xix, figs. 1 *a*, *b*	161
Cardita, (Lam.) Blain	161
C. planicosta, Lam., pl. xix, figs. 2, *a*, *b*	161
Corbula, Lam	161
C. nasuta, Conrad, pl. xix, fig. 4	161
Venus vespertina, n. s., Conrad, 1857, pl. xix, figs. 5 *a*, *b*	162
Cytherea, Lam	162
C. nuttali, Conrad, pl. iv, fig. 5	162
Volutalithes, Swainson	162
V. sayana, Conrad, pl. xix, fig. 6	162
Natica, Lam	162
N. limula, Conrad, pl. xix, fig. 7	162
Turritella, Lam	163
Turritella, ——, Conrad, 1857, pl. xix, fig. 8	163
Cassidula, Humphreys	163
Subgenus *Lacinia*, Conrad	163
C. (*Lacinia*) *alveata*, Conrad, pl. xix, fig. 9	163

APPENDIX.

Cretaceous fossils.

Pa

Cardita subtetrica, n. s., Conrad, 1857, pl. xxi, fig. 5 .....
Pholadomya sancti-sabæ, Roemer, pl. xxi, fig. 4 .....
Capsa, Lam. .....
C. texana, n. s., Conrad, 1857, pl. xxi, fig. 6 .....
Terebratula leonensis, n. s., Conrad, 1857, pl. xxi, fig. 2 .....
Turritella leonensis, n. s., Conrad, 1857, pl. xxi, figs. 7 *a*, *b* .....
Hamites larvatus, Conrad, pl. xxi, fig. 8 .....

11.

Conrad, T. A. Check list of the Invertebrate Fossils of North America. Eocene a Oligocene. <Smithsonian miscellaneous collections, 200 pp., i–iv, and 1- Washington, 1866.

NOTES AND EXPLANATIONS.

Pa

Nummulites floridana, Conrad=*Nemophora floridana*, Con. .....
Turbinolia goldfussii, Lea=*Platytrochus goldfussii* (Lea), Edwards .....
Turbinolia stokesii, Lea=*Platytrochus stokesii* (Lea), Edwards .....
Anthophyllum cuneiforme, Conrad=*Flabellum cuneiforme* (Con.), Lonsdale .....
Turbonillia maclurii, Lea=*Endopachys maclurii* (Lea), Conrad .....
Scutella lyelli, Conrad=*Mortonia* (*Periarchus*) *lyelli*, Conrad .....
Orbitolites interstitia (Lea), *Lunulites* Gabb & Horn=*Lunulites interstitia*, Lea .....
Lunulites bouei, Lea=*Discofustrellaria bouei* (Lea), Gabb & Horn .....
Orbitolites discoidea Lea=*Capularia discoidea* (Lea), Gabb & Horn .....
Lunulites duclosii, Lea=*Heteractis duclosii* (Lea), Gabb & Horn .....
Terebratula wilmingtonensis, Lyell & Sowerby=*Rhynchonella wilmingtonensis* (Lyell & Sowerby), Conrad .....
Ostrea eversa, Deshayes=*Gryphostrea eversa* (Deshayes), Conrad .....
Pecten calvatus, Morton=*Camptonectes calvatus* (Morton), Conrad .....
Leda compsa, Gabb=*Nuculana compsa* (Gabb), Conrad .....
Nucula cultelliformis, Rogers=*Nuculana cultelliformis* (Rogers), Conrad .....
Nucula magna, Lea=*Nuculana magna* (Lea), Conrad .....
Nucula media, Lea=*Nuculana media* (Lea), Conrad .....
Leda Oregona, Shumard=*Nuculana Oregona* (Shumard), Conrad .....
Nucula ovula, Lea=*Nuculana ovula* (Lea), Conrad .....
Nucula parva, Rogers=*Nuculana parva* (Rogers), Conrad .....
Nucula plana, Lea=*Nuculana plana* (Lea), Conrad .....
Nucula plicata, Lea=*Nuculana plicata* (Lea), Conrad .....
Nucula pulcherrima, Lea=*Nuculana pulcherrima* (Lea), Conrad .....
Nucula semen, Lea=*Nuculana semen*. (Lea) Conrad .....
Cucullæa ononcheila, Rogers=*Latiarca ononcheila*, (Rogers) Conrad .....
Cucullæa transversa, Rogers=*Latiarca transversa*, (Rogers) Conrad .....
Arca rhomboidella, Lea=*Anomolocardia rhomboidella*, (Lea) Conrad .....
Pectunculus ellipsis, Lea=*Limopsis ellipsis*, (Lea) Conrad .....
Nucula pectunculoides, Lea=*Limopsis pectunculoides*, (Lea) Conrad .....
Crenella concentrica, Gabb=*Staligmium concentricum*, (Gabb) Conrad .....
Astarte minutissima, Lea=*Micromeris minutissima*, (Lea) Conrad .....
Astarte parva, Lea=*Micromeris parva*, (Lea) Conrad .....
Egeria inflata, Lea=*Sphærella inflata*, (Lea) Conrad .....
Dosinia gyrata, Gabb=*Lucina gyrata*, (Gabb) Conrad .....
Corbis lamellosa, Conrad (not Lam.)=*Gafrarium liratum*, Conrad .....
Cytherea lenticularis, Rogers=*Dosiniopsis lenticularis*, (Rogers) Conrad .....
Venus floridana, Conrad=*Cryptogramma floridana*, Conrad .....
Venus penita, Conrad=*Cryptogramma? penita*, Conrad .....
? Cytherea ovata, Rogers=*Dione ovata*, (Rogers) Conrad .....
Egeria plana, Lea=*Tellina plana*, (Lea) Conrad .....
Anatina claibornensis, Lea=*Periploma claibornensis*, (Lea) Conrad .....
Solen diegoensis, Gabb=*Plectosolen? diegoensis*, (Gabb) Conrad .....
Solen parallelus, Gabb=*Plectosolen parallelus*, (Gabb) Conrad .....
Bulla dekayi, Lea=*Cylichna dekayi*, (Lea) Conrad .....
Actæon impressa, Gabb=*Tornatellæa impressa*, (Gabb) Conrad .....
Pasithea striata, Lea=*Actæonema striata*, (Lea) Conrad .....
Pasithea sulcata, Lea *Actæonema sulcata*, (Lea) Conrad .....

	Page.
Marginella biplicata, Lea = *Ringicula biplicata*, (Lea) Conrad	34
Melinia nitidula, Meek = *Limnæa nitidula*, Meek	34
Limnæa tenuicostata, M. & H. = *Limnæa* (*Pleurolimnæa*) *tenuicostata*, M. & H.	34
Bulimus limnæiformis, M. & H. = *Spiraxis hay[illegible]*, Meek	34
Helix spatiosa, Meek = *Macrocyclis spatiosa*, (M. & H.) Meek	34
Bulimus perversus, M. & H. = *Clausilia contraria*, (M. & H.) Meek	34
Bulimus teres, M. & H. = *Clausilia teres*, (M. & H.) Meek	34
Bulimus vermiculus, M. & H. = *Clausilia vermicula*, (M. & H.) Meek	34
Dentalium (Ditrupa?) pusillum, Gabb = *Gadus pusillus*, (Gabb) Conrad	34
Ditrupa subcoarctata, Gabb = *Gadus subcoarctatus*, (Gabb) Conrad	34
Rotella nana, Lea = *Umbonium nana*, (Lea) Conrad	34
Narica diegoana, Conrad = *Vanikoro diegoana*, (Conrad) Meek	34
Hipponyx pygmæa, Lea = *Concholepas pygmæa*, (Lea) Conrad	34
Calyptræa trochiformis, Lea = *Trochita trochiformis*, (Lea) Conrad	34
Galerus excentricus, Gabb = *Galeropsis excentricus*, (Gabb) Conrad	34
Turritella striata, Lea = *Mesalia striata*, (Lea) Conrad	34
Melania? multistriata, M. & H. = *Campeloma multistriata*, (M. & H.) Meek	34
Paludina multilineata, M. & H. = *Campeloma multilineatum*, (M. & H.) Meek	35
Paludina vetula, M. & H. = *Campeloma vetulum*, (M. & H.) Meek	35
Melania anthonii, M. & H. = *Hydrobia anthonii*, M. & H	35
Melania minutula, M. & H. = *Micropyrgus minutulus*, M. & H	35
Natica alabamiensis, Whitfield = *Lacunaria alabamiensis*, (Whitfield) Conrad	35
Natica erecta, Whitfield = *Lacunaria erecta*, (Whitfield) Conrad	35
Melania humerosa, M. & H. = *Tiara humerosa*, Meek	35
Cerithium nodulosum, Hall = *Goniobasis? nodulosa*, (Hall) Meek	35
Melania arcta, M. & H. = *Goniobasis? arcta*, Meek	35
Cerithium fremontii, Hall = *Goniobasis? fremontii*, (Hall) Meek	35
Melania simpsoni, Meek = *Goniobasis? simpsoni*, Meek	35
Melania sublævis, M. & H = *Goniobasis? sublævis*, (M. & H.) Meek	35
Melania subtortuosa, M. & H. = *Goniobasis? subtortuosa*, (M. & H.) Meek	35
Melania tenuicarinata, M. & H. = *Goniobasis? tenuicarinata*, (M. & H.) Meek	35
Cerithium tenerum, Hall = *Goniobasis? tenera*, (Hall) Meek	35
Solarium henrici, Lea = *Architectonica henrici*, (Lea) Conrad	35
Solarium ornatum, Lea = *Architectonica ornata*, (Lea) Conrad	35
Delphinula plana, Lea = *Architectonica plana*, (Lea) Conrad	35
Solarium pseudogranulatum, d'Orbigny = *Architectonica pseudogranulata*, (d'Orbigny) Conrad	35
Delphinula depressa, Lea = *Solariorbis depressus*, (Lea) Conrad	35
Turbo lineatus, Lea = *Solariorbis lineatus*, (Lea) Conrad	35
Planaria nitens, Lea = *Solariorbis nitens*, (Lea) Conrad	35
Pasithea aciculata, Lea = *Eulima aciculata*, (Lea) Conrad	35
Pasithea lugubris, Lea = *Eulima lugubris*, (Lea) Conrad	35
Pasithea notata, Lea = *Eulima notata*, (Lea) Conrad	35
Pasithea scale, Lea = *Eulima scale*, (Lea) Conrad	35
Actæon melanellus, Lea = *Obeliscus melanellus*, (Lea) Conrad	35
Actæon pygmæus, Lea = *Obeliscus pygmæus*, (Lea) Conrad	35
Actæon striatus, Lea = *Obeliscus striatus*, (Lea) Conrad	35
Mitra costata, Lea = *Pyramimitra costata*, (Lea) Conrad	35
Natica minima, Lea = *Lunatia minima*, (Lea) Conrad	35
Natica alveata, Conrad = *Ampullina alveata*, Conrad	35
Natica gibbosa, Lea = *Neverita gibbosa*, (Lea) Conrad	35
Naticina obliqua, Gabb = *Catinus obliquus*, (Gabb) Conrad	35
Sycotypus penitus, Conrad = *Ficopsis penitus*, Conrad	35
Buccinum sowerbii, Lea = *Semicassis sowerbii*, (Lea) Conrad	35
Fusus remondii, Gabb = *Ficopsis remondii*, (Gabb) Conrad	36
Fusus cooperi, Gabb = *Ficopsis cooperi*, (Gabb) Conrad	36
Ficus mammillatus, Gabb = *Ficopsis mammillatus*, (Gabb) Conrad	36
Hemifusus hornii, Gabb = *Priscoficus hornii*, (Gabb) Conrad	36
Mitra flemingii, Lea = *Caricella flemingii*, (Lea) Conrad	36
Mitra fusoides, Lea = *Conomitra fusoides*, (Lea) Conrad	36
Mitra mooreana, Gabb = *Lapparia mooreana*, (Gabb) Conrad	36
Mitra lineata, Lea = *Fusimitra? lineata*, (Lea) Conrad	36
Mitra minima, Lea = *Fusimitra? minima*, (Lea) Conrad	36
Fasciolaria moorei, Gabb = *Cordieria moorei*, (Gabb) Conrad	36
Fasciolaria plicata, Lea = *Latirus* (*Peristernia*) *plicatus*, (Lea) Conrad	36

	Page.
Ancillaria elongata, Gabb = *Lamprodoma elongata*, (Gabb) Conrad	36
Oliva gracilis, Lea = *Lamprodoma gracilis*, (Lea) Conrad	36
Olivia phillipsii, Lea = *Lamprodoma phillipsii*, (Lea) Conrad	36
Anolax gigantea, Lea = *Ancillopsis altile*, Conrad	36
Anolax plicata, Lea = *Olivula? plicata*, (Lea) Conrad	36
Agaronia punctulifera, Gabb = *Olivula punctulifera*, (Gabb) Conrad	36
Fusus taitii, Lea = *Cornulina armigera*, Conrad	36
Monoceras sulcatum, Lea = *Pseudoliva sulcata*, (Lea) Conrad	36
Tritonium diegoensis, Gabb = *Buccinofusus diegoensis*, (Gabb) Conrad	36
Pleurotoma beaumontii, Lea = *Surcula beaumontii*, (Lea) Conrad	36
Pleurotoma cælata, Lea = *Surcula cælata*, (Lea) Conrad	36
Pleurotoma childreni, Lea = *Surcula childreni*, (Lea) Conrad	36
Pleurotoma desmoyersii, Lea = *Surcula desmoyersii*, (Lea) Conrad	36
Pleurotoma kellogii, Gabb = *Surcula kellogii*, (Gabb) Conrad	36
Pleurotoma monilifera, Lea = *Surcula monilifera*, (Lea) Conrad	36
Pleurotoma nodocarinata, Gabb = *Surcula nodocarinata*, (Gabb) Conrad	36
Pleurotoma obliqua, Lea = *Surcula obliqua*, (Lea) Conrad	36
Pleurotoma rugosa, Lea = *Surcula rugosa*, (Lea) Conrad	36
Pleurotoma sayi, Lea = *Surcula sayi*, (Lea) Conrad	36
Pleurotoma varicostata, Gabb = *Surcula varicostata*, (Gabb) Conrad	36
Pleurotoma lonsdalii, Lea = *Drillia lonsdalii*, (Lea) Conrad	36
Pleurotoma texana, Gabb = *Drillia texana*, (Gabb) Conrad	36
Papillina altilis, Conrad = *Clavifusus altile*, Conrad	36
Fusus cooperi, Conrad = *Clavifusus cooperi*, Conrad	36
Fusus conybearii, Lea = *Strepsidura conybearii*, (Lea) Conrad	36
Pelagus vanuxemi, Conrad = *Aturia vanuxemi*, Conrad	36
Nautilus lamarckii, Deshayes = *Cymomia lamarckii*, (Deshayes) Conrad	37
Clavella Vicksburgensis, Conrad = *Piestocheilus Vicksburgensis*, (Con.) Meek	37
Nummulites mantelli, Morton = *Orbitolites* (*Orbitoides*) *mantelli*, Morton	37
Scutella crustuloides, Morton = *Mortonia* (*Periarchus*) *crustuloides*, (Mort.) Conrad	37
Scutella pileus-sinensis, Ravenel = *Mortonia* (*Periarchus*) *pileus-sinensis*, (Rav.) Conrad	37
Echinus infulatus, Morton = *Cœlopleurus inflatus*, (Morton) Desor	37
Scutella jonesii, Forbes = *Clypeaster jonesii*, (Forbes) Desor	37
Scutella rogersi, Morton = *Clypeaster rogersi*, (Morton) Conrad	37
Mortonia tumida, Conrad = *Clypeaster tumidus*, Conrad	37
Pyrgorhynchus mortonis, Mich. = *Echinianthus mortonis*, (Mich.) Desor	37
Catopygus patelleformis, Bouvé = *Cassidulus patelliformis*, (Bouvé) Desor	37
Cellepora tubulata, Lonsdale = *Eschara tubulata*, (Lonsd.) Gabb & Horn	37
Terebratula lachryma, Morton = *Terebratulina lachryma*, (Mort.) Conrad	37
Plagiostoma dumosa, Morton = *Spondylus dumosus*, (Morton) Conrad	37
Umbrella planulata, Conrad = *Operculatum planulatum*, Conrad	37
Doliopsis, n. g., Conrad = *Galeodea* (*Galeodaria*) *quinquecostata*, Conrad	37

12.

CONRAD, T. A. [Description of a new genus and subgenus.] <Rep. U. S. Geol. and Geogr. Surv. Terr., F. V. Hayden, vol. ii. The vertebrata of the Cretaceous formations of the West by E. D. Cope, pp. 23–24. Washington, 1875.

	Page.
Haploscapha, n. g., Conrad, 1875	23
H. grandis, n. s., Conrad, 1875	23-24
Cucullifera, n. s. g., Conrad, 1875	24
H. (*Cucullifera*) *eccentrica*, n. s., Conrad, 1875	24

III.—THE WRITINGS OF JAMES DWIGHT DANA.

1.

DANA, J. D. Zoophytes. <U. S. Expl. Exp. during the years 1838–1842 under the command of Charles Wilkes, U. S. N., vol. vii, pp. 1–741, Atlas pls. i–lxi. Philadelphia, 1846.

Many fossil genera are mentioned and discussed in this work.

2.

DANA, J. D. Genera of Fossil Corals of the family Cyathophyllidæ. <Amer. Journ. Sci., 2d ser., vol. i, pp. 178–189, figs. 1–5. New Haven, 1846.

This article is extracted from the report of the United States Exploring Expedition during the years 1838-'42, under the command of Charles Wilkes, U. S. N. Zoophytes, by James D. Dana, Geologist of the Expedition, pp. 1–741. 4to. See entry No. 1.

	Page.
Family *Cyathophyllidæ*	179–182
Cyathophyllum	182–183
Calophyllum, n. g., Dana, 1846	183–184
Amplexus, Sowerby	184
Caninia, Michelin	184
Acervularia, Schweigger	184–186
Arachnophyllum, n. g., Dana, 1846, fig. 1, p. 186	186
Cystiophyllum, Lonsdale	186
Cliziophyllum, n. g., Dana, 1846, figs. 2 and 3, p. 187	187
Michelinia, Koninck	187
Columnaria, Goldfuss, fig. 4, p. 188	188
Sarcinula, Lamarck	188–189

3.

DANA, J. D. Description of Fossil Shells of the collections of the Exploring Expedition under the command of Charles Wilkes, U. S. N., obtained in Australia, from the lower layers of the coal formation in Illawara, and from a deposit probably of nearly the same age at Harper's Hill, valley of the Hunter. <Amer. Journ. Sci., 2d ser., vol. iv. Appendix, pp. 151–160. New Haven, 1847.

	Page.
Bellerophon undulatus, n. s., Dana, 1847	151
Bellerophon strictus, n. s., Dana, 1847	151
Platyschisma? depressum, n. s., Dana, 1847	151
Pleurotomaria tri-filata, n. s., Dana, 1847	151
Pleurotomaria nuda, n. s., Dana, 1847	151
Natica —— ? Dana, 1847	151
Patella tenella, n. s., Dana, 1847	151–152
Pentadia, n. g., Dana, 1847	152
P. spatangus, n. s., Dana, 1847	152
P. reniformis, n. s., Dana, 1847	152
P. trigonia, n. s., Dana, 1847	152
Lingula ovata, n. s., Dana, 1847	152
Terebratula amygdala. n. s., Dana, 1847	152
Terebratula elongata, n. s., Dana, 1847	152
Productus fragilis, n. s., Dana, 1847	153
Solen (Solecurtus?) ellipticus, n. s., Dana, 1847	153
Solen (Solecurtus?) planulatus, n. s., Dana, 1847	153
Pholadomya undata, n. s., Dana, 1847	153
Allorisma audax, n. s., Dana, 1847	153
Cleobis, n. g., Dana, 1847	154
C. grandis, n. s., Dana, 1847	154

	Page.
C. gracilis, n. s., Dana, 1847	154
C.? recta, n. s., Dana, 1847	154
Astarte gemma, n. s., Dana, 1847	154-155
Astartila, n. g., Dana, 1847	155
A. intrepida, n. s., Dana, 1847	155
A. cyprina, n. s., Dana, 1847	155
A. cytherea, n. s., Dana, 1847	155
A. polita, n. s., Dana, 1847	155
A. cyclas, n. s., Dana, 1847	155
A. transversa, n. s., Dana, 1847	155-156
Cardinia, Agassiz	156
C. recta, n. s., Dana, 1847	156
C. cuneata, n. s., Dana, 1847	156
Pyramus, n. g., Dana, 1847	156-157
P. ellipticus, n. s., Dana, 1847	157
P. myiformis, n. s., Dana, 1847	157
Nucula abrupta, n. s., Dana, 1847	157
Nucula ——? Dana, 1847	157
Cypricardia rugulosa, n. s., Dana, 1847	157
Cypricardia sinuosa, n. s., Dana, 1847	157-158
Myonia, n. g., Dana, 1847	158
M. elongata, n. s., Dana, 1847	158
M. valida, n. s., Dana, 1847	158
Eurydesma elliptica, n. s., Dana, 1847	158
Eurydesma globosa, n. s., Dana, 1847	158
Modiolopsis simplex, n. s., Dana, 1847	158
Modiolopsis siliqua, n. s., Dana, 1847	159
Modiolopsis prærupta, n. s., Dana, 1847	159
Modiolopsis imbricata, n. s., Dana, 1847	159
Modiolopsis arcodes, n. s., Dana, 1847	159
Modiolopsis acutifrons, n. s., Dana, 1847	159-160
Avicula ——? Dana, 1847	160
Pecten comptus, n. s., Dana, 1847	160
Pecten tenuicollis, n. s., Dana, 1847	160
Pecten lenuisculus, n. s., Dana, 1847	160

4.

DANA, J. D. Fossils of the Exploring Expedition under the command of Charles Wilkes, U. S. N., a fossil fish from Australia, and a Belemnite from Terra Del Fuego. <Am. Journ. Sci., vol. v, 2d ser., pp. 433–435. New Haven, 1848.

	Page.
Urosthenes, n. g., Dana, 1848	433-434
U. australis, n. s., Dana, 1848	434
Helicerus, n. g., Dana, 1848	434
H. fuegiensis, n. s., Dana, 1848	434
Cardinia? exilis, McCoy=*Cardinia recta*, Dana	434
Pleurotomaria morrisiana, McCoy=*Pleurotomaria triflata*, Dana	434
Pachydomus ovalis, McCoy	434
Pachydomus pusillus, McCoy	434
Pachydomus sacculus, McCoy	434
Eurydesma cordata? Morris	434
Notomya, McCoy=*Pyramus*, Dana	434

5.

DANA, J. D. Descriptions of fossils. <U. S. Expl. Exp., 1838–'42, under the command of Charles Wilkes, U. S. N. Geology. By James D. Dana. Vol. x, Appendix, pp. 681–729, *pars*. Atlas, xxi, pls. *pars*. Philadelphia, 1849.

APPENDIX I.

FOSSILS OF NEW SOUTH WALES.

	Page.
Pisces	681
Urosthenes, Dana, 1848	681
Urosthenes australis, Dana, 1848	681-682

	Page.
ellusca	682
Brachiopoda	682
Terebratula amygdala, Dana, 1847	682
Terebratula elongata, Dana, 1847. pl. i, figs. 3 *a*, *b*	682–683
Terebratula ——?, Dana, 1849. pl. i, figs. 4 *a*, *b*	683
Terebratula? ——, Dana, 1849, pl. i, fig. 5	683
Spirifer glaber, pl. i, fig. 6 *a*, *b*	683
Spirifer darwinii (J. Morris), pl. i, fig. 7 *a*	684
Spirifer duodecicostatus (McCoy), pl. ii, figs. 1 *a*, 1 *b*	684
Spirifer ——, Dana, 1849, pl. ii, fig. 2	684
Spirifer vespertilia (G. Sowerby), pl. ii, figs. 3 *a–c*	685
Spirifer phalæna, n. s., Dana, 1849, pl. ii, fig. 4	685
Siphonotreta? curta, n. s., Dana, 1849, pl. ii, figs. 5 *a*, *b*	685
Lingula ovata, n. s., Dana, 1849, pl. ii, figs. 6 *a*, *b*	685–686
Productus fragilis, Dana, pl. vii, figs. 7 *a–c*	686
Productus brachytherus (G. Sowerby), pl. ii, fig. 8	686
Acephala	686
Solecurtus? ellipticus, Dana, pl. ii, fig. 9	686
Solecurtus (Psammobia?) planulatus, Dana, pl. ii, fig. 10	686–687
Pholadomya (Platymya) undata, Dana, pl. ii, figs. 11 *a*, *b*	687
Pholadomya (Homomya) glendonensis, n. s., Dana, 1849, pl. ii, fig. 12	687
Pholadomya (Homomya) audax, Dana, pl. iii, figs. 1 *a–c*	687
Pholadomya (Homomya) curvata [?] (J. Morris). Dana, pl. iii, figs. 2 *a*, *b*	687
Astarte gemma, Dana, pl. iii, figs. 4 *a*, *b*	688
Astartila, Dana, 1847	688
A. intrepida, Dana, 1847, pl. iii, figs. 5, 5 *a*	689
A. cyprina, Dana, 1847, pl. iii, figs. 6, 6 *a*	689
A. cytherea, Dana, 1847, pl. iv, figs 1, 1 *a*	689
A. polita, Dana, 1847, pl. iv, figs. 2 *a–c*	690
A. cyclas, Dana, 1847, pl. iv, figs. 3, 3 *a*	690
A. transversa Dana, 1847, pl. iv, figs. 4 *a*, *b*	690
A.? corpulenta, n. s., Dana, 1849, pl. iii, figs. 3 *a–c*	691
Cardinia recta, Dana, pl. iv, figs 5 *a*, *b*	691
Cardinia? cuneata, Dana, pl. iv, figs. 6, 6 *a–c*	692
Cardinia? costata (J. Morris), Dana, pl. iv, figs. 8 *a–c*	692
Pachydomus	692–693
P. cuneatus (J. D. Sowerby), Morris, pl. v, figs. 1, 1 *a*	693
P. antiquatus, (J. D. Sowerby), Morris, pl. v, fig. 2	693–694
P. leris (J. D. Sowerby), Morris	694
Mæonia, Dana	694
Mæonia, Dana	694
Pyramia, Dana	695
Oleobis, Dana	695
Mæonia elongata, Dana, 1847, pl. v, figs. 3 *a–c*	695
M. valida, Dana, 1847, pl. v, figs. 4 *a–b*	695
M. axinia, Dana, 1847, pl. v, figs. 5 *a*, *b*	696
M.? carinata (J. Morris), Dana, pl. vi, figs. 1 *a*, *b*	696
M. fragilis, n. s., Dana, 1849, pl vi, figs. 2, 3	696–697
M. myiformis, Dana, 1847, pl. vi, fig. 4 *a*	697
? M. elliptica, Dana, 1849, pl. vi, fig. 5 *a*, *c*	697
M. gigas (M'Coy), Dana	697
M. grandis, Dana, 1847, pl. vi, fig. 7	697–698
M. gracilis. Dana, 1847. pl. vii, figs. 1 *a*, *c*	698
M.? recta, Dana, 1847, pl. vii, fig. 2	698
Nucula abrupta, Dana, 1847, pl. vii, fig. 3	698
Nucula concinna, n. s., Dana, 1849, pl. vii, fig. 4	699
Nucula glendonensis, n. s., Dana, 1849, pl. vii, fig 5	699
Eurydesma, Morris	699
E. elliptica, Dana, 1847, pl. vii, figs. 6 *a–d*	700
E. globosa, Dana, 1847. pl. vii, figs. 7, 7 *a*	700
E. sacculus (M'Coy), Dana, pl. vii, figs. 8 *a*, *b*	700
E. cordata (Morris)	700–701
Cardium australe (M'Coy), Dana, pl. viii, fig. 2	701
Cardium ferox, n. s., Dana, 1849, pl. viii, fig. 3	701
Cypricardia	701–702

Page.
Phyllotheca australis, pl. xiii, fig. 6, pl. xiv, figs. 1 [2?] 718–719
Clasteria, n. g., Dana, 1849 719
C. australis, n. s., Dana, 1849 719–720
Anarthrocanna australis, n. s., Dana, 1849, pl. xiv, fig. 6 *a* 720
Oystocirites? pl. xiv, fig. 6, *b* 720
Austrella rigida, n. s., Dana, 1849, pl. xiv, figs. 7, 8 720
Conferrites? tenella, n. s., Dana, 1849, pl. xiv, fig. 9 720

FOSSILS FROM TIERRA DEL FUEGO.

Helicerus, Dana, 1848 720
H. fuegiensis. Dana, pl. xv, fig. 1 *a–e* 720–721

FOSSILS FROM SAN LORENZO, PERU.

Trigonia Lorentii, n. s. (Dana), 1849, pl. xv, fig. 2 *a–c* 721
Turbo ——, Dana, 1849, pl. xv, fig. 3 *a*, *b* 721
Nautilus tenui–planatus, n. s., Dana, 1849, pl. xv, fig. 4 721

FOSSIL AMMONITE FROM THE ANDES.

Ammonites pickeringi, Dana, pl. xv, fig. 5 721
Ammonites, pl. xv, fig. 6 721
Ostraca pl. xv, fig. 7 722

FOSSILS FROM NORTHWESTERN AMERICA.

Cetacean, pl. xvi, fig. 1 722
Fishes, pl. xvi, fig. 2, pl. xvi, fig. 3, pl. xvii, figs. 1, 2 *a*, 2 *b* 722
Crustacea.
Callianassa oregonensis, n. s., Dana, 1849 722–723
Balanus ——? Dana, pl. xvii, fig. 4 720
Radiata.
Galerites oregonensis, n. s., Dana, 1849, figs. 5, 6, 6 *a*, pl. xxi, figs. 7, 8 720

E WRITINGS OF CHRISTIAN GOTTFRIED EHRENBERG.

1.

G, C. G. On Infusorial Deposits on the River Chutes in Oregon. Amer. ci., 2d ser., Vol. IX, p. 140. New Haven, 1850.

notice of the author's work in the Monatsb. Akad., Berlin, February, 1849, p. 76.

2.

G, C. G. Über das mächtigste bis jetzt bekannt gewordene (angeblich 500 ächtige) Lager von mikroskopischen reinen kieselschaligen Süsswasser- n am Wasserfall-Flusse im Oregon. <Bericht über die zur Bekanntma- geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaf- Berlin aus dem Jahre 1849. February. pp. 76–87. Berlin, 1850.

ea.	*G. undulata.*
is americ.?	*Himantidium arcus.*
ica.	*Navicula sigma.*
s.	*N. bacillum.*
	N. scalprum.
	N. semen.
	N. sistoula.
	Pinnularia affinis.
	P. amphioxys.
perum.	*P. digitus.*
	P. gastrum.
	P. macilenta.
	P. mesogongyla.
n.	*P. pachyptera.*
	P. placentula.
gonica.	*P. oregonica.*
hioxys.	*P. viridis.*
	P. viridula.
	Podosphenia pupula.
	Rhaphoneïs foliacea.
	R. lanceolata.
	R. oregonica.
	Surirella bifrons.
	S. plicata.
	Stauroneis baileyi.
ni.	*S. semen.*
	Synedra ulna.
	S. spendida.
nata.	*Amphidiscus armatus.*
ala.	*Lithodontium furcatum.*
a.	*L. nasutum.*
radoxum.?	*L. scorpius.*
gracile.	*Lithostylidium amphiodon.*
m.	*L. crenulatum.*
	L. læve.
	L. quadratum.
num.	*L. rude.*
	L. trabecula.
a.	*Lithostylidium.?*
ornata.	*Spongolithis acicularis.*
	S. aspera.
	S. fustis.
	S. inflexa.
	S. mesogongyla.

V—THE WRITINGS OF JAMES HALL.

1.

LL, JAMES. Organic remains. Descriptions of organic remains collected by Captain J. C. Frémont, in the geographical survey of Oregon and North California. <Rep. Expl. Exp. to the Rocky Mountains and to Oregon and North California, by J. C. Frémont. Appendix B, pp. 304–310, pls. i–iv. Washington, 1845.

	Page.
Sphenopteris fremonti, n. s., Hall, 1845, pl. ii, figs. 3, 3 *a*	304
S. triloba, n. s., Hall, 1845, pl. i, fig. 8	304
S. (?) paucifolia, n. s., Hall, 1845, pl. ii, figs. 1 *a–d*	304–305
S. (?) trifoliata, n. s., Hall, 1845, pl. ii, figs. 2, 2 *a*	305
Glossopteris phillipsii, n. s., Hall, 1845, pl. ii, figs. 5, 5 *a–c*	305–306
Pecopteris undulata, n. s., Hall, 1845, pl. i, figs. 1, 1 *a*	306
Pecopteris undulata var., Hall, 1845, pl. i, figs. 2, 2 *a, b*	306
Pecopteris (?) odontopteroides, n. s., Hall, 1845, pl. i, figs. 3, 4	306
Trichopteris, n. g., Hall, 1845	306
T. flamentosa, n. s., Hall, 1845, pl. ii, fig. 6	306–307
T. gracilis, n. s., Hall, 1845, pl. i, fig. 5	307
Stems of ferns, pl. i, fig. 7	307
Leaf of a Dycotyledonous plant (?), pl. ii, fig. 4	307
Mya tellinoides, n. s., Hall, 1845, pl. iii, figs. 1, 2	307
Nucula impressa, (?) n. s., Hall, 1845, pl. iii, fig. 3	308
Cytherea parvula, n. s., Hall, 1845, pl. iii, figs. 10, 10 *a*	308
Pleurotomaria uniangulata, n. s., Hall, 1845, pl. iii, figs. 4, 5	308
Cerithium tenerum, n. s., Hall, 1845, pl. iii, figs. 6, 6 *a*	308
Cerithium fremonti, n. s., Hall, 1845, pl. iii, figs. 7, 7 *a*	308
Natica (?) occidentalis, n. s., Hall, 1845, pl. iii, figs. 8, 8 *a*	308–309
Turritella bilineata, n. s., Hall, 1845, pl. iii, fig. 9	309
Cerithium nodulosum, n. s., Hall, 1845, pl. iii, figs. 11, 12	309
Turbo paludinaeformis, n. s., Hall, 1845, pl. iii, fig. 13	309
Leaves of Dicotyledonous plants, pl. iii, figs. 14, 15	309
Inoceramus ——?, Hall, 1845, pl. iv, figs. 1, 1 *a*	309–310
Inoceramus ——?, Hall, 1845, pl. iv, fig. 2	310

2.

LL, JAMES. Description of new or rare species of fossils, from the Palæozoic series. <Rep. on the Geology of the Lake Superior Land district, by J. W. Foster and J. D. Whitney. Part ii, chapter xiii, pp. 203-231, pls. xxiii*a*–xxxv. Washington, 1851.

POTSDAM AND CALCIFEROUS SANDSTONES.

	Page.
Lingula prima, Conrad, pl. xxiii, figs. 1 *a–g*	204
Lingula antiqua, Hall, pl. xxiii, figs. 2 *a–c*	204–205
Trilobites of the Potsdam Sandstone	205
Ilsell[o]cephalus, D. D. Owen, pl. xxiii, figs. 3 *a–e*, and fig. 4	205–206

FOSSILS FROM THE CHAZY, BIRD'S EYE, BLACK RIVER, AND TRENTON LIMESTONES AND HUDSON RIVER GROUP.

Phenopora multipora, n. s., Hall, 1851, pl. xxiv, figs. 1 *a, b*	206–207
Clathropora flabellata, n. s., Hall, 1851, pl. xxiv, figs. 2 *a, b*	207
Chætetes lycoperdon, Say, pl. xv, figs. 1 *a–d*	207–208
Schizocrinus nodosus?, pl. xxv, figs. 2 *a–c*	208

Page.

Echinosphaerites?, n. s., Hall, 1851, pl. xxv, figs. 3 *a*, *b* 206-207
Crinoidea, or *Cystidea* 207
—— ?, pl. xxv, figs. 4 *a–c* 207
Murchisonia major, n. s., Hall, 1851, pl. xxvi, figs. 1 *a–c* 209-210
Acaphus barrandi, n. s., Hall, 1851, pl. xxvii, figs. 1 *a–d*, and pl. xxviii 210-211
Herpes seconabia, n. s., Hall, 1851, pl. xxvii, fig. 2 *a* 211-212
Phacops calliocephalus, pl. xxvii, figs. 3 *a*, *b* 212
Catenipora gracilis, n. s., Hall, 1851, pl. xxix, figs. 1 *a*, *b* 212-213
Sarcinula? obsoleta, n. s., Hall, 1851, pl. xxix, fig. 2 *a*, *b* 213
Modiolopsis pholadiformis, n. s., Hall, 1851, pl. xxx, figs. 1 *a–c*, and pl. xxxi, fig. 1 213-214
Modiolopsis modiolaris, Hall, pl. xxxi, figs. 2 *a–d* 214-215
Ambonychia carinata, Hall, pl. xxxi, fig. 3 215

CLINTON GROUP.

Tracks and trails of vertebrates? 215
Tracks of Crustaceans? 219

NIAGARA GROUP.

Huronia vertebralis, Stokes, pl. xxxiv, fig. 1 220
Huronia annulata, n. s., Hall, 1851, pl. xxxiv, fig. 4 221
Discosorus conoideus, pl. xxxiv, figs. 2 and 3 222-223

UPPER HELDERBERG LIMESTONES.

Dictyonema fenestrata, pl. xxxv, figs. 1 *a*, *b* 223-224
Proetus ——?, Hall, 1851, pl. xxxv, fig. 2 224
Phacops anchiops, pl. xxxv, figs. 3 *a*, *b* 224-225

LIST OF FOSSILS.

General remarks on the above list 229
Table of the number of species of fossils found in the State of New York and the Lake Superior district 230

3.

HALL, JAMES. Letter from Professor James Hall, of New York, containing observations on the Geology and Palæontology of the country traversed by the expedition, and notes upon some of the Fossils collected on the route. <Exploration and Survey of the Valley of the Great Salt Lake of Utah, including a reconnaissance of a new route through the Rocky Mountains, by Howard Stansbury. Appendix E, pp. 398–414, pls. i–iv. Philadelphia, 1852.

CORALS.

Page

Cyathophyllidæ.
Faviphyllum? rugosum, n. s., Hall, 1852, pl. i, figs. 1 *a*, *b* 407-408
Zaphrentis? multilamella, n. s., Hall, 1852, pl. i, fig. 2 408
Zaphrentis stansburii, Hall, n. s., 1852, pl. i, figs. 3 *a*, *b* 407
Lithostro[n]tion —— (sp. indet.), Hall, 1852, pl. i, fig. 4 *a*, *b* 408
Brachiopoda.
Terebratula subtilita, n. s., Hall, 1852, pl. iv, figs. 1 *a*, *b*, 2 *a*, *b* 409
Spirifer heniplicata, n. s., Hall, 1852, pl. iv, figs. 3 *a*, *b* 409
S. octoplicata? pl. iv, fig. 4 *a*, *b* 409-410
S. triplicata, Hall, n. s, 1852, pl. iv, figs. 5 *a–c* 410
Chonetes variolata, (D'Orb. sp.) DeKoninck, pl. iii, figs. 1 *a*, *b* 410
Productus costatus? DeKoninck, pl. iii, fig. 2 411
P. semireticulatus, DeKoninck pl. iii, figs. 3–5 *a*, *b* 411
Productus —— (sp. indet.), Hall, 1852, pl. iii, fig. 4 411
Orthis umbraculum? pl. iii, fig. 6 412
Acephala.
Avicula? cuata, pl. ii, figs. 1 *a*, *b* 412
Tellinomya protensa, Hall, n. s., 1852, pl. ii, fig. 3 412
Cypricardia occidentalis, n. s., Hall, 1852, pl. iv, fig. 2 412
Allorisma terminalis, n. s., Hall, 1852, pl. ii, figs. 4 *a*, *b* 413
A. nucula arata, n. s., Hall, 1852, pl. ii, figs. 5 *a*, *b* 413
Gasteropoda.
Pleurotomaria coronula, n. s., Hall, 1852, pl. ii, figs. 6 *a–c* 413-414
Euomphalus subplanus, n. s., Hall, 1852, pl. ii, figs. 7 *a*, *b* 414

4.

ALL, JAMES. Descriptions and Notices of the Fossils collected upon the route. <Rep. Expls. and Surys. from the Mississippi River to the Pacific Ocean, vol. iii. No. 1, general report upon the geological collections, chapter ix, pp. 99–105, pls. i and ii. Washington, 1856.

CRETACEOUS SPECIES.

	Page.
Gryphæa, Lamarck	99
G. pitcheri, Morton, 1834, pl. i, figs. 1–6	99–100
G. pitcheri, var. *navia*, Hall, 1856, (pl. i, figs. 7–10) *	100
Ostrea, Linnæus	100
O. congesta, Conrad, 1843, pl. i, fig. 11	100–101

CARBONIFEROUS SPECIES.

Terebratula [L]hwyd	101
T. millepunctata, n. s., Hall, 1856, pl. ii, figs. 1, 2	101
T. subtilita, Hall, pl. ii, figs. 3–5	101
Spirifer, Sowerby	101
S. lineatus, pl. ii, figs. 6–8	101–102
S. kentuckensis, Shumard, 1855, pl. ii, figs. 10, 11	102
S. cameratus, Morton, 1836, pl. ii, figs. 9, 12, 13	102–103
Productus, Sowerby	103
P. semireticulatus, Martin, 1809, pl. ii, figs. 16, 17	103
P. rogersi, Norwood & Pratten, 1854, pl. ii, figs. 14, 15	104
Imperfect specimens, the specific characters of which are obscure or indeterminable	104–105

5.

ALL, JAMES. Geology and Palæontolgy of the Boundary. <U. S. and Mex. Boundary Survey. Report of William H. Emory, vol. i, part ii, pp. 101–140, and 144–146, pls. i and xx and xxi pars. Washington, 1857.

The fossils figured on pl. xx were apparently named by James Hall, but no descriptions accompany them.

Columnaria thomii, n. s., Hall, 1857, pl. xx, figs, 1 *a–d*.
Terebratula mexicana, n. s., Hall, 1857, pl. xx, figs. 2 *a–c*.
Orthis arachnoides, n. s., Hall, 1857, pl. xx, figs. 3 *a*, *b*.
Euomphalus michleranus, n. s., Hall, 1857, pl. xx, fig. 4.
Asaphus emoryi, n. s., Hall, 1857, pl. xx, fig. 5.

The Echinoderms in this report are described by Professor Hall.

	Page.
Pyrina Parryi, n. s., Hall, 1857, pl. i, figs. 1 *a–d*	144–145
Toxaster texanus, Rœmer, pl. i, figs. 2 *a–c*	145
Cyphosoma texanum, Rœmer, pl. i, figs. 3 *a–c*	145
Holectypus planatus, n. s., ? Hall, 1857, pl. i, figs. 4 *a–f*	145–146
Toxaster elegans, Shumard, sp. pl. xxi, figs. 1 *a–c*	146

Gryphea Pitcheri, (Mort.), Hall is figured on pl. xxi, figs, 3 *a–c*, but its locality is not mentioned and it is not described.

6.

LL, JAMES, *and* WHITFIELD, R. P. Palæontology. <Rep. Geol. Expl. 40th parallel by Clarence King, vol. iv, part ii, pp. 199–302, pls. i–vii. Washington, 1877.

FOSSILS OF THE POTSDAM GROUP.

Brachiopoda.	Page.
Obolella, Bill	205
O. discoida, n. s., H. & W., 1877, pl. i, figs, 1, 2	205
Lingulepis, Hall	206
L. mæra, n. s., H. & W., 1877, pl. i, figs, 5–7	206

These figures are copied from Marcou's figures of *Gryphæa Pitcheri*, Mort., except fig. 10, which is ied from a figure of Marcou's *Gryphæa dilatata*, Sow., Bull. Geol. Soc. France, 2d ser. vol. xii, pl. xxi, Geology of North America, pl. iv.

Page.
L. ? minuta, n. s., H. & W., 1877, pl. i, figs. 3, 4 206-207
Kutorgina, Billings 207
K. minutissima, n. s., H. & W., 1877, pl. i, figs. 11, 12 207-208
Leptæna, Dalman 208
L. melita, n. s., H. & W., 1877, pl. i, figs. 13, 14 208-209
Crustacea.
Conocephalites, Zenker, =*Conocoryphe* Corda 209
Subgenus *Crepicephalus*, Owen ? = *Loganellus*, Devine 209
Crepicephalus (*Loganellus*) *haguei*, n. s., H. & W., 1877, pl. ii, figs. 14, 15 210-212
C. (*Loganellus*) *nitidus*, n. s., H. & W., 1877, pl. ii, figs. 8–10 212-214
C. (*Loganellus*) *granulosus*, n. s., H. & W., 1877, pl. ii, figs. 2, 3 214-215
C. (*Loganellus*) *maculosus*, n. s., H. & W., 1877, pl. ii, figs. 24, 25, and 26 ? 215-216
C. (*Loganellus*) *unisulcatus*, n. s., H. & W., 1877, pl. ii, figs. 22, 23 216-217
C. (*Loganellus*) *simulator*, n. s., H. & W., 1877, pl. ii, figs. 16–18 218
C. (*Loganellus*) *anytus*, n. s., H. & W., 1877, pl. ii, figs. 19–21 219-220
C. (*Bathyurus ?*) *angulatus*, n. s., H. & W., 1877, pl. ii, fig. 28 220-221
Pterocephalus, Roemer 221
Conocephalites (*Pterocephalus*) *laticeps*, n. s., H. & W., 1877, pl. ii, figs. 4–7 221-223
Ptychaspis, Hall 223
P. pustulosa, n. s., H. & W., 1877, pl. ii, fig. 27 223-224
Charionephalus, Hall 224
C. tumifrons, n. s., H. & W., 1877, pl. ii, figs. 38, 39 224-225
Dikellocephalus, Owen 225-226
D. bilobatus, n. s., H. & W., 1877, pl. ii, fig. 36 226
D. multicinctus, n. s., H. & W., 1877, pl. ii fig. 37 226-227
D. flabellifer, n. s., H. & W., 1877, pl. ii, figs. 29, 30 227-228
Agnostus, Brongniart 228
A. communis, n. s., H. & W., 1877, pl. i, figs. 28, 29 228-229
A. neon, n. s., H. & W., 1877, pl. i, figs. 26, 27 229-230
A. prolongus, n. s., H. & W., 1877, pl. i. figs. 30, 31 230-231
A. tumidosus, n. s., H. & W., 1877, pl i, fig. 32 231

FOSSILS OF THE LOWER SILURIAN.

Brachiopoda.
Lingulepsis, Hall 232
L. ella, n. s., H. & W., 1877, pl. i, fig. 8 232
Orthis, Dalman 232
O. pogonipensis, n. s., H. & W., 1877, pl. i, figs. 9, 10 232-233
Strophomena, Rafinesque 233
S. nemea, n. s., H. & W., 1877, pl. i, fig. 15 233-234
Porambonites, Pander 234
P. obscurus, n. s., H. & W., 1877, pl. i, fig. 16 234
Gasteropoda.
Raphistoma, Hall 235
R. acuta, n. s., H. & W., 1877, pl. i, figs. 20–22 235
Maclurea, Lesueur 235
M. minima, n. s., H. & W., 1877, pl. i, figs. 17–19 235-236
Fusispira, Hall 236
F. compacta, n. s., H. & W., 1877, pl. i, fig. 25 236-237
Cyrtolites, Conrad 237
C. sinuatus, n. s., H. & W., 1877, pl. i, figs. 23, 24 237
Crustacea.
Conocephalites, Zenker 237
C. subcoronatus, n. s., H. & W., 1877, pl. ii, fig. 1 237-238
Crepicephalus, Owen ? = *Loganellus*, Devine 238
C. ? (Loganellus) quadrans, n. s., H. & W., 1877, pl. ii, figs. 11–13 238-240
Dikellocephalus, Owen 240
D. quadriceps, n. s., H. & W., 1877, pl. i, figs. 37–40 240-241
D. wahsatchensis, n. s., H. & W., 1877, pl. i, fig. 35 241-242
D. ? gothicus, n. s., H. & W., 1877, pl. i, fig. 36 242-243
Bathyurus, Billings 243
B. pogonipensis, n. s., H. & W., 1877, pl. i, figs. 33, 34 243-244
Ogigia, Brongn. 244
O. producta, n. s., H. & W., 1877, pl. ii, figs. 31–34 244-245
O. parabola, n. s., H. & W., 1877, pl. ii, fig. 35 245-246

Page.

FOSSILS OF THE DEVONIAN.

Brachiopoda.

Strophodonta, Hall 246
S. canace, H. & W., pl. iii, figs. 1–3 246–247
Rhynchonella, Fischer 247
R. emmonsi, n. s., H. & W., 1877, pl. iii, figs. 4–8 247–248

Lamellibranchiata.

Paracyclas, Hall 248
P. peroccidens, n. s., H. & W., 1877, pl. iii, figs. 14–17 248
Nuculites, Conrad 248
N. triangulus, n. s., H. & W., 1877, pl. iii, figs. 12, 13 248–249
Lunulicardium, Munster 249
L. fragosum, Meek, pl. ii, figs. 9, 11 249–250

Gasteropoda.

Bellerophon, Montf. 250
B. neleus, n. s., H. & W., 1877, pl. iii, figs. 18–20 250–251

FOSSILS OF THE WAVERLY GROUP.

Radiata.

Michelina, D'Kon. 251
Michelina——sp.? H. & W., 1877, pl. iv, fig. 19. 251–252

Brachiopoda.

Streptorhynchus, King 252
S. equivalvis, Hall, pl. iv, figs. 1, 2 252
S. inflatus, White & Whitf., 1862, pl. iv, fig. 3 252–253
Strophomena, Rafinesque 253
S. rhomboidalis, Wilckens, pl. iv, fig. 4 253
Chonetes, Fischer 253
C. loganensis, n. s., H. & W., 1877, pl. iv, fig. 9 253–254
Spirifera, Sow 254
S. centronata, Winchell, 1865, pl. iv, figs. 5, 6 254–255
S. alba-pinensis, n. s., H. & W., 1877, pl. iv, figs. 7, 8 255–256
Athyris. McCoy 256
A. claytoni, n. s., H. & W., 1877, pl. iv, figs. 15–17 256–257
A. planosulcata? n. s., H. & W., 1877, pl. iv, figs. 10, 11 257
Rhynchonella, Fischer 257
R. pustulosa, White? pl. iv, figs. 12–14 257–258
Terebratula (Lihwyd.), Brug 258
T. utah, n. s., H. & W., 1877, pl. iv, fig. 18 258

Gasteropoda.

Euomphalus, Sow. 259
E. (Straparollus) utahensis, n. s., H. & W., 1877, pl. iv, figs. 20–23 259–260
E. laxus, White. MSS., pl. iv, figs. 24, 25 260–261
E. (Straparollus) ophirensis, n. s., H. & W., 1877, pl. iv, figs 26, 27 261

Crustacea.

Proetus, Stein. 262
P. perocciden, n. s., H. & W., 1877, pl. iv, figs. 28–32 262–264
P. loganensis, n. s., H. & W., 1877, pl. iv, fig. 33 264

FOSSILS OF THE LOWER CARBONIFEROUS.

Brachiopoda.

Orthis. Dalman 265
O. resupinata? Martin. sp., pl. v., figs. 1, 2 265
Productus, Sowerby 265
P. flemingi var. *burlingtonensis*. Hall, pl. v, figs. 9–12 265–266
P. laviceatus? White? 1860, pl. v, figs. 7, 8 266–267
P. semireticulatus. Martin, pl. v. figs. 5, 6 267–268
P. elegans, n. s., H. & W., 1877, pl. v, figs. 3, 4 268–269
Spirifera. Sowerby 269
S. striata, pl v. figs. 13–15 269–270
S. setigera. Hall, pl. v, figs. 17, 18 270–271
Spirifera—— sp.? H. & W., 1877, pl. v, fig. 16 271
Athyris, McCoy 271
A. subquadrata? Hall, pl. v, figs 19, 20 271–272

FOSSILS OF THE COAL-MEASURES AND PERMO-CARBONIFEROUS.

Lamellibranchiata.

Aviculopecten, McCoy 272
A. walcottensis, n. s., H. & W., 1877, pl. vi, fig. 5 272

Page.

A. curto-cardinalis, n. s., H. & W., 1877, pl. vi, fig. 4 ..... 273—274
A. parvulus, n. s., H. & W., 1877, pl. vi, fig. 6 ..... 274—275
Myalina, De Koninck 275
M. avicuioides, M. & H., 1860, pl. vi, fig. 8 ..... 275—276
M. permiana, Swallow, 1858, pl. vi, fig. 7 276
Sedgewickia, McCoy 276
S.? concava, M, & H., 1858, pl. vi, fig. 3 ..... 276—277
Cardiomorpha, De Koninck 277
C. missouriensis, Swallow, 1858, pl. vi, figs. 1, 2 277
Cephalopoda.
Cyrtoceras, Goldf 278
C. cessator, n. s., H, & W., 1877, pl. vi, fig. 15 278
Goniatites, De Haan 279
G. kingii, n. s., H. & W., 1877, pl. vi, figs. 9–14 ..... 279—280

FOSSILS OF THE TRIASSIC FORMATION.

Radiata.
Echinodermata.
Pentacrinites, Miller 280
P. asteriscus? M. & H., 1858, pl. vi, fig. 16 ..... 280—281
Brachiopoda.
Spiriferina, D'Orb 281
S. homfrayi? Gabb, pl. vi, fig. 18 281
Spirifera (Spiriferina?) alia, n. s., H. & W., 1877, pl. vi. fig. 17 ..... 281—282
Terebratula, (Llhwyd.), Brug. 282
T. humboldtensis, Gabb, pl. vi, figs. 22–24 ..... 282—283
Lamellibranchiata.
Edmondia, De Koninck 283
E. myrina, n. s., H. & W., 1877, pl. vi, fig. 19 283

FOSSILS OF THE JURASSIC PERIOD.

Brachiopoda.
Rhynchonella, Fischer 284
R. myrina, n. s., H. & W., 1877, pl. vii, figs. 1–5 284
R. gnathophora? Meek, pl. vii, fig. 6 ..... 284—285
Terebratula (Llhwyd.), Brug 285
T. augusta, n. s., H. & W., 1877, pl. vii, figs. 7–10 285
Lamellibranchiata.
Ostrea, Linn. 285
Ostrea —— sp.? H. & W., 1877, pl. vii, fig. 12 ..... 285—286
Gryphæa, Lam. 286
G. calceola, var. *nebrascensis*, H. & W., 1877, M. & H., 1861, pl. vii, fig. 11 ..... 286—287
Aviculopecten, McCoy 288
A. (Eumicrotis?) augustensis, n. s., H. & W., 1877, pl. vii, figs. 14–16 288
Eumicrotis, Meek 289
E. curta, Hall, pl. vii, fig. 24 289
Camptonectes, Agassiz 289
C. bellistriatus, Meek, pl. vii, fig. 13 ..... 289—290
C. extenuatus, Meek, pl. vii, fig. 18 ..... 290—291
C. pertenuistriatus, n. s., H. & W., 1877, pl. vii, fig. 17 ..... 291—292
Lima, Brug. 292
L. (Plagiostoma) occidentalis, n. s., H. & W., 1877, pl. vii, fig. 23 ..... 292—293
Trigonia, Brug. 293
T. quadrangularis, n, s., H. & W., 1877, pl. vii, fig. 22 ..... 293—294
Leptocardia, (n. g.), H. & W., 1877 294
L. typica, n. s., H. & W., 1877, pl. vii, figs. 26–29 ..... 295—296
L. carditoidea, n. s., H. & W., 1877, pl. vii, fig. 25 ..... 296—297
Astarte, Sowerby 297
A.? arenosa, n. s., H. & W., 1877, pl. vi, figs. 20–21 ..... 297—298
Gasteropoda.
Natica, Lam. 298
N.? lelia, n. s., H. & W., 1877, vii, figs. 19–21 ..... 298—299
Classified list of the fossils described in this report 301–303

7.

HALL, JAMES, and MEEK, F. B. (see MEEK, F. B., and HALL, JAMES).

VI.—THE WRITINGS OF ANGELO HEILPRIN.

1.

ILPRIN, ANGELO. On some new species of Eocene mollusca from the southern United States. <Proc. U. S. National Museum, vol. iii, pp. 149–152, pl. 1, 1880. Washington, 1881.

	Page.
Pleurotoma, Lamarck	149
P. pagoda, n. s., Heilprin, 1880, pl. —, fig. 1	149–150
P. venusta, n. s., Heilprin, 1880, pl. —, fig. 2	150
P. platysoma, n. s., Heilprin, 1880, pl. —, fig. 3	150
Eucheilodon, Gabb	150
E. creno-carinata, n. s., Heilprin, 1880, pl. —, fig. 4	150
Scalaria, Lamarck	150
S. unilineata, n. s., Heilprin, 1880, pl. —, fig. 5	150–151
Fusus, Lamarck	151
Subgenus *Strepsidura*, Swainson	151
F. (Strepsidura) marnochi, n. s., Heilprin, pl. —, fig. 6	151
Terebra, Lamarck	151
T. plicifera, n. s., Heilprin, pl. —, fig. 8	151
Crassatella, Lamarck	151
C. declivis, n. s., Heilprin, pl. —, fig. 9	151–152

2.

ILPRIN, ANGELO. North American tertiary Ostreidæ. <4th Annual Rep. of the director of the U. S. Geological Survey. A review of the fossil ostreidæ of North America; and a comparison of the fossil with the living forms by C. A. White. Appendix I, pp. 309–316, pls. lxiv–lxxii. Washington, 1883.

	Page.
Ostrea, Linnæus	309
EOCENE.	
Ostrea alabamensis, Lea, pl. lxiv, figs. 2–4	309
Ostrea carolinensis, Conrad	309
Ostrea compressirostra, Say, pl. lxv, figs. 1–2	309
Ostrea cretacea, Morton	310
Ostrea divaricata, Lea, pl. lxiv, fig. 1	310
Ostrea eversa, Mellville, sp., pl. lxiv, figs. 5–8	310
Ostrea falciformis, Conrad	311
Ostrea mortoni, Gabb	311
Ostrea sellæformis, Conrad, pl. lxii, figs. 1,2; pl. lxiii, fig. 1	311
Ostrea thirsæ, Gabb, pl. lxiii, figs. 4–6	311
Ostrea trigonalis, Conrad	311
Ostrea tuomeyi, Conrad	311
OLIGOCENE.	
Ostrea georgiana, Conrad	311–312
Ostrea vicksburgensis, Conrad, pl. lxiii, figs. 2,3	312
MIOCENE.	
Ostrea atwoodi, Gabb, pl. lxviii, figs. 4, 5	312
Ostrea borealis, Lamarck	312
Ostrea contracta, Conrad, pl. lxix. figs. 1, 2	312

Page.

Ostrea disparilis, Conrad, pl. lxvi, figs. 1, 2 312
Ostrea panzana, Conrad 313
Ostrea percrassa, Conrad, pl. lxvii, fig. 3 313
Ostrea sculpturata, Conrad, pl. lxx, fig. 2 313
Ostrea subfalcata, Conrad, pl. lxviii, figs. 1-3 313
Ostrea subjecta, Conrad 313
Ostrea tayloriana, Gabb, pl. lxvii, figs. 1, 2 313
Ostrea titan, Conrad 313–314
Ostrea veleriana, Conrad, pl. lxx, fig. 1 314
Ostrea virginica, Gmelin (=*O. virginiana*, Lamarck) 314

PLIOCENE.

Ostrea atwoodi, Gabb 314
Ostrea bourgeoisii, Rémond, pl. lxxi, fig. 1 214
Ostrea heermanni, Conrad 314
Ostrea vespertina, Conrad, pl. lxxi, figs. 2–4 315

POST-PLIOCENE.

Ostrea conchaphila, Carpenter 315
Ostrea fundata (Say ?), F. S. Holmes 315
Ostrea gallus, Valenciennes 315
Ostrea lurida, Carpenter, pl. lxxii, figs. 2, 3 316
Ostrea veatchii, Gabb, pl. lxxii, fig. 1 316

VII.—THE WRITINGS OF ALPHEUS HYATT.

1.

HYATT, ALPHEUS. [Descriptions of new genera and remarks on new species of Triassic fossils.] < Rep. Geol. Expl. 40th Parallel, by Clarence King. Vol. iv, part i, pp. 107–128 *pars*. Washington, 1877.

	Page.
Clydonitidæ, n. f., Hyatt, 1877	107
* *Coroceras*, n. g., Hyatt, 1877	107–108
Clydonites, Hauer	109
C. lævidorsatus, Hauer, sp., 1860, pl. x, fig. 7	109–110
Trachyceratidæ, n. f., Hyatt, 1877	110
† *Gymnotoceras*, n. g., Hyatt, 1877	110–111
G. rotelliforme, Meek, 1877, pl. x, figs. 9, 9 *a*	112–113
G. blakei, Gabb, sp., 1864, pl. x, figs. 10. *a–c*, and pl. xi, figs. 6, 6 *a*	115–116
Trachyceras, Laube	116
T. whitneyi, Gabb, sp., 1864, pl. xi, figs. 3, 3 *a*	117–118
T. judicaricum, Mojsisovics, 1869, pl. xi, figs. 1, 1 *a*	118
Arcestidæ.	
Arcestes, Suess, 1865	119–120
A. ? perplanus, Meek, 1877, pl. xi, figs. 7, 7 *a*	121
A. gabbi, Meek, 1877, pl. x, figs. 6, 6 *a*, *b*	123
Physanoidæ, Hyatt, 1877	124
‡ *Aerochordiceras*, n. g., Hyatt, 1877	124
A. hyatti, Meek, 1877, pl. xi, figs. 5, 5 *a*	125–126
§ *Eutomoceras*, n. g., Hyatt, 1877	126
‖ *Rudiceoceras*, n. g., Hyatt, 1877	128

2.

HYATT, ALPHEUS. [Description of the new genus Meekoceras, and remarks on the different species of the same.] <Contributions to Invertebrate Paleontology No. 5, Triassic fossils of Southeastern Idaho, by C. A. White. Twelfth Ann. Rep. of the U. S. Geol. and Geogr. Surv. of the Terr., by F. V. Hayden. pp. 112–116, pls. xxxi–xxxii. Washington, 1883.

An author's edition of these contributions was published in 1880.

	Page.
Meekoceras, n. g., Hyatt, 1880	112
M. aplanatum, n. s., White, 1880	113
M. muchbachianum, n. s., White, 1880	114
M. gracilitatis, n. s., White, 1880	115–116
Arcestes ? cirratus, n. s., White, 1880	117

3.

[illegible]PHEUS. [Description of the new genus Enclimatoceras.] <On the [illegible]id genus Enclimatoceras Hyatt, and a description of the type species. [illegible]ozoic fossils, by C. A. White, Bull. U. S. Geol. Surv. No. 4. Vol. i, pp. [illegible]o. 4, or pp. 104–105 of vol. i. Washington, 1884.

[illegible]*ceras*, n. g., Hyatt, 1884	104–105

---

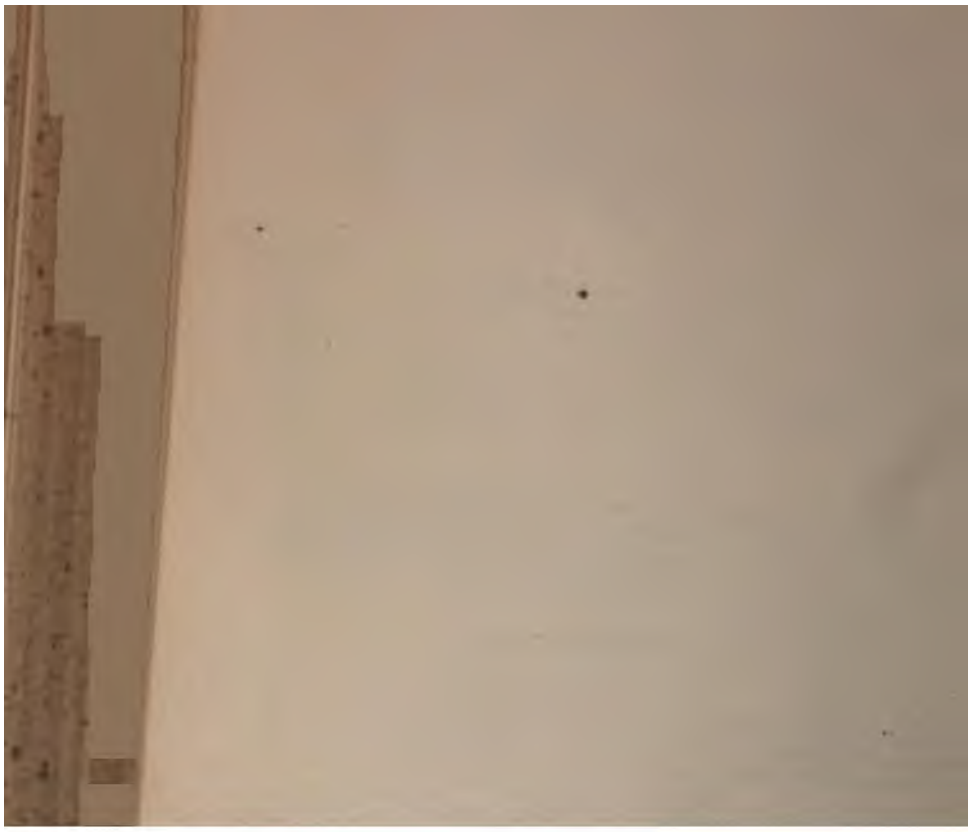
* κέρας, a helmet; κέρας, a horn.

† γυμνός, naked; νῶτος, back; κέρας, a horn.

πρωτερός, a wart; κέρας, a horn.

§ (augm. part.); τομος, sharp; κέρας, a horn.

(augm. part.); δίσκος, a quoit; κέρας, a horn.



Page.

Construction of the Geological map of the United States and the British Provinces; Criticisms of the American Journal of Science and Arts, conducted by Professors B. Silliman, B. Silliman, jr., and James D. Dana 85–98
A synopsis of the history of the progress and discoveries of Geology in North America. 99–121
List of maps and memoirs on the Geology of North America 122–143
Note 144

PALEONTOLOGY.

FOSSILS OF THE TERTIARY ROCKS.

Ostrea virginica var. *californica*, Marcou, 1858, pl. v, figs. 2, 2 *a* 32–33

FOSSILS OF THE CRETACEOUS ROCKS.

Ptychodus whipplei, n. s., Marcou, 1858, pl. i, figs. 4, 4 *a* 33
Ammonites shumardi, n. s., Marcou, 1858, pl. i, figs. 1, 1 *a* 33–34
Ammonites belknapii, n. s., Marcou, 1858, pl. ii, figs. 1 *a*, 1 *b* 34
Ammonites peruvianus, de Buch., pl. v, figs. 1, 1 *a*, 1 *b* 34–35
Ammonites gibbonianus, Lea, pl. ii, fig. 2 *a*, 2 *b* 35
Ammonites novi-mexicana, n. s., Marcou, 1858, pl. i, figs. 2, 2 *a* 35–36
Hamites fremonti, n s., Marcou, 1858, pl. i, fig. 3 36
Inoceramus lerouxi, n. s., Marcou, 1858, pl. ii, fig. 3 36–37
Isocardia washita, n. s., Marcou, 1858, pl. iii, figs. 2, 2 *a*, 2 *b* 37
Gryphæa sinuata var. *americana*, Marcou, 1858, pl. iii, fig. 1 37–38
Gryphæa pitcheri, Morton, pl. iv, figs. 5, 5 *a*, *b*, and 6 38–40
Holaster comanchesi, n. s., Marcou, 1858, pl. iii, figs. 3, 3 *a* 40–41
Exogyra flabellata, Goldf 41–42
Cytherea missouriana, Mort 42
Telkina occidentalis, Mort 42
Caprotina texana, Roem 42

FOSSILS OF THE JURASSIC ROCKS.

Gryphæa dilatata var. *tucumcarii*, Marcou, 1858, pl. iv, figs. 1, 1 *a*, 1, 2, 3 43
Ostrea marshii, Sow., pl iv, fig. 4 43–44

FOSSILS OF THE MOUNTAIN LIMESTONE OR LOWER CARBONIFEROUS ROCKS.

Orthoceras nora-mexicana, n. s., Marcou, 1858, pl. vii, fig. 1 44
Myalina apachesi, n. s., Marcou, 1858, pl. vii, figs. 6, 6 *a* 44–45
Productus delawarii, n. s., Marcou, 1858, pl. v, fig. 3 45
Productus cora, d'Orb., pl. vi, figs. 4, 4 *a* 45
Productus cora var. *mogayoni*, Marcou, 1858, pl. vi, fig. 5 45–46
Productus semi-reticulatus, Mart., pl. v, figs. 4, 4 *a*, pl. vi, fig. 6 46
Productus costatus, Sow., pl. v, fig. 5 46–47
Productus flemingii, Sow., pl. vi, fig. 7 47
Productus scabriculus, Mart., pl. v, figs. 6, 6 *a* 47–48
Productus pyxidiformis, de Kon., pl. vi, figs. 3, 3 *a* 48
Productus pustulosus, Phill., pl. vi, fig. 1 48
Productus punctatus, Mart., pl. vi, fig. 2 48
Orthis pecosii, n. s., Marcou, 1858, pl. vi, figs. 14, 14 *a*, *b* 48–49
Orthis crenistria, Phill 49
Spirifer striatus, Mart., pl. vii, figs. 2, 2 *a* 49
Spirifer striatus var. *triplicatus*, Marcou, 1858, pl. vii, fig. 3 ..... 49, 50
Spirifer rocky-montani, n. s., Marcou, 1858, pl, vii, figs. 4, 4 *a–c* 50
Spirifer lineatus, Mart., pl. vii, figs. 5, 5 *a–c* 50
Terebratula rocky-montana, n. s., Marcou, 1858, pl. vi, figs. 13, 13 *a–c* 50–51
Terebratula mormonii, n. s., Marcou, 1858, pl. vi, figs. 11, 11 *a–c* 51
Terebratula uta, n. s., Marcou, 1858, pl. vi, figs. 12, 12 *a–c* 51
Terebratula royssii, Léveillé, pl. vi, figs. 10, 10 *a*, *b* 51–52
Terebratula plano-sulcata, Phill., pl. vi, figs. 8, 8 *a–b* 52
Terebratula subtilita, Hall, pl. vi, figs. 9, 9 *a–f* 52
Zaphrentis stansburyi, Hall, pl. vii, fig. 7 52–53
Zaphrentis cylindrica, Milne-Edwards & Jules Haime, pl. vii, fig. 8 53
Amplexus coralloides? Sow 53

10.

MARCOU, JULES. Report on the Geology of a portion of Southern California. <An nual Report upon the Geographical Surveys West of the One Hundredth Meri dian, in California, Nevada, Utah, Colorado, Wyoming, New Mexico, Arizona and Montana, by George M. Wheeler, First Lieutenant of Engineers, U. S. A. being Appendix J J of the Annual Report of the Chief of Engineers for 187 Appendix H, pp. 158–172. Washington, 1876.

	Page
Pliocene rocks of Los Angeles	158–15
The Sierra of Santa Monica	159–16
Sierra Madre, Pacoña or Pacorina Cañon	160–16
Geology of the vicinity of the San Fernando Mission	16
The San Fernando sierra	161–16
Asphaltum and mineral oil near San Franciquito ranch	164–16
Sierra liebre and California desert	16
Cañada de las Uvas	166–16
Tertiary rocks in the vicinity of Fort Tejon	167–16
Tertiary rocks of California	1
Glacial rocks of Southern California and Pike's Peak	169–
Mountain chains and their ages	
The Sierra Madre	170-
Coast Range	171
Sierras of San Fernando and Santa Monica	
Hills of Los Angeles	

The occurrence of many fossils is mentioned in this report.

IX.—THE WRITINGS OF JOHN STRONG NEWBERRY.

1.

NEWBERRY, J. S. Palæontology. <Report upon the Colorado River of the West, by Lieut. Joseph C. Ives. Part iii, chapter xi, pp. 116–132, pls. i–iii. Washington, 1861.

	Page.
Archæocidaris, McCoy	116
A. longispinus, n. s., Newberry, 1861, pl. i, figs. 1 and 1 *a*	116
A. ornatus, n. s., Newberry, 1861, pl. i, figs. 2, 3, 3 *a*	116–117
A. gracilis, n. s., Newberry, 1861, pl. i, figs. 4, 4 *a*	117
Ammonites, Brug	117
A. percarinatus, H. & M., 1856	117–118
Nautilus, Breynius	118
Nautilus, sp., Newberry, 1861	118
Bellerophon, Montfort	118
Inoceramus, Sowerby	119
I. problematicus, D'Orb.	119
I. crispii? Mantell	119
Pinna, Linn.	119
P.? lingula, n. s., Newberry, 1861	119–120
Gryphæa, Lamarck	120
G. pitcheri, Morton	120
G. pitcheri var. *navia*, Hall	120
Allorisma, King	120
A. capax, n. s., Newberry, 1861, pl. i, figs. 9, 9 *a*	120–121
Productus rogersi, Norwood & Pratten	121
P. iveri, n. s., Newberry, 1861, pl. ii, figs. 1–8	122
P. occidentalis, n. s., Newberry, 1861, pl. ii, figs. 9, 10	122
P. calhounianus, Swallow	123
P. costatus, Sowerby	123
P. costatoides, Swallow	123–124
P. semireticulatus, Martin, De Koninck	124
P. nodosus, n. s., Newberry, 1861, pl. i, figs. 7, 7 *b*	124
P. splendens? Norwood & Pratten, 1855	124–125
P. scabriculus, Martin	125
Streptorhynchus, King	125
S. umbraculum, Von Buch	125–126
S. pyramidalis, n. s., Newberry, 1861, pl. ii, figs. 11–13	126
S. occidentalis, n. s., Newberry, 1861, pl. i, figs. 5, 5 *a*	126
Athyris	126
A. subtilita, Hall	126–127
Spirifer, Sowerby	127
S. cameratus, Mort.	127
S. rockymontani, Marcou	127
S. lineatus, De Koninck	127–128
Chonetes, Fisher	128
C. verneuiliana, Norwood & Pratten, pl. ii, fig. 6	128
Rhynconella, Fisher	128
R. uta, Marcou	128
Pecten, Linn.	128
P. occidentalis, Shumard	128
P. (Monotis?) coloradensis, n. s., Newberry, 1861, pl. i, figs. 6, 6 *a*	129
Fus[u]lina, Fisher	129
F. cylindrica, Fisher	129

10.

MARCOU, JULES. Report on the Geology of a portion of Southern California. <Annual Report upon the Geographichl Surveys West of the One Hundredth Meridian, in California, Nevada, Utah, Colorado, Wyoming, New Mexico, Arizona, and Montana, by George M. Wheeler, First Lieutenant of Engineers, U. S. A., being Appendix J J of the Annual Report of the Chief of Engineers for 1876. Appendix H, pp. 158–172. Washington, 1876.

	Pages.
Pliocene rocks of Los Angeles	158–159
The Sierra of Santa Monica	159–160
Sierra Madre, Pacoña or Pacorina Cañon	160–161
Geology of the vicinity of the San Fernando Mission	161
The San Fernando sierra	161–164
Asphaltum and mineral oil near San Franciscquito ranch	164–166
Sierra liebre and California desert	166
Cañada de las Uvas	166–167
Tertiary rocks in the vicinity of Fort Tejon	167–169
Tertiary rocks of California	169
Glacial rocks of Southern California and Pike's Peak	169–170
Mountain chains and their ages	170
The Sierra Madre	170–171
Coast Range	171–172
Sierras of San Fernando and Santa Monica	172
Hills of Los Angeles	172

The occurrence of many fossils is mentioned in this report.

IX.—THE WRITINGS OF JOHN STRONG NEWBERRY.

1.

WBERRY, J. S. Palæontology. <Report upon the Colorado River of the West, by Lieut. Joseph C. Ives. Part iii, chapter xi, pp. 116–132, pls. i–iii. Washington, 1861.

	Page.
Archæocidaris, McCoy	116
A. longispinus, n. s., Newberry, 1861, pl. i, figs. 1 and 1 *a*	116
A. ornatus, n. s., Newberry, 1861, pl. i, figs. 2, 3, 3 *a*	116–117
A. gracilis, n. s., Newberry, 1861, pl. i, figs. 4, 4 *a*	117
Ammonites, Brug	117
A. percarinatus, H. & M., 1856	117–118
Nautilus, Breynius	118
Nautilus, sp., Newberry, 1861	118
Bellerophon, Montfort	118
Inoceramus, Sowerby	119
I. problematicus, D'Orb.	119
I. crispi? Mantell	119
Pinna, Linn.	119
P.? lingula, n. s., Newberry, 1861	119–120
Gryphæa, Lamarck	120
G. pitcheri, Morton	120
G. pitcheri var. *navia*, Hall	120
Alloriasma, King	120
A. capax, n. s., Newberry, 1861, pl. i, figs. 9, 9 *a*	120–121
Productus rogersi, Norwood & Pratten	121
P. iowensis, n. s., Newberry, 1861, pl. ii, figs. 1–8	122
P. occidentalis, n. s., Newberry, 1861, pl. ii, figs. 9, 10	122
P. calhounianus, Swallow	123
P. costatus, Sowerby	123
P. costatoides, Swallow	123–124
P. semireticulatus, Martin, De Koninck	124
P. nodosus, n. s., Newberry, 1861, pl. i, figs. 7, 7 *b*	124
P. splendens? Norwood & Pratten, 1855	124–125
P. scabriculus, Martin	125
Streptorhynchus, King	125
S. umbraculum, Von Buch	125–126
S. pyramidalis, n. s., Newberry, 1861, pl. ii, figs. 11–13	126
S. occidentalis, n. s., Newberry, 1861, pl. i, figs. 5, 5 *a*	126
Athyris	126
A. subtilita, Hall	126–127
Spirifer, Sowerby	127
S. cameratus, Mort.	127
S. rockymontani, Marcou	127
S. lineatus, De Koninck	127–128
Chonetes, Fisher	128
C. verneuiliana, Norwood & Pratten, pl. ii, fig. 6	128
Rhynconella, Fisher	128
R. uta, Marcou	128
Pecten, Linn.	128
P. occidentalis, Shumard	128
P. (Monotis?) coloradensis, n. s., Newberry, 1861, pl. i, figs. 6, 6 *a*	
Fus[u]lina, Fisher	
F. cylindrica, Fisher	

Page.

FOSSIL PLANTS.

Cyclopteris, Brong. 129
C. moquensis, n. s., Newberry, 1861, pl. iii, figs. 1, 2 129–130
Pecopteris, Brong. 130
P. cycloloba, n. s., Newberry, 1861, pl. iii, figs. 3, 4, 4 *a* 130–131
Neuropteris, Brong. 131
N. angulata, n. s., Newberry, 1861, pl. iii, fig. 5 131
Sphenopteris, Brong. 131
Subspecies, Newberry, 1861 131
Phyllites, Sternb. 131
P. venosissimus, n. s., Newberry, 1861, pl. iii, fig. 6 131
P. coriaceous, n. s., Newberry, 1861, pl. iii, figs. 7, 7 *a* 132
Olalhropteris, Brong. 132

2.

NEWBERRY, J. S. Descriptions of the Carboniferous and Triassic Fossils collected on the San Juan Exploring Expedition under Capt. J. N. Macomb, U. S. Engineers. <Rep. Expl. Exp. from Santa Fé, New Mexico, to the junction of the Grand and Green rivers of the Great Colorado of the West in 1859, under the command of Capt. J. N. Macomb, 135–148, pls. iii–viii. Washington, 1876.

Page.

Deltodus mercurei, n. s., Newberry, 1876, pl. iii, figs. 1, 1 *a* 137
Ptychodus whipplei, Marcou, pl. iii, figs. 2, 2 *a–f* 137–138
Athyris subtilita, Hall, sp 138
Spirifer cameratus, Morton 138
Spirifer (Trigonotreta?) texanus, Meek, 1871, pl. iii, figs. 5, 5 *a*, *b* 139–140
Productus nodosus, Newberry, pl. iii, figs. 3, 3 *d* 140
Pleurotomaria excelsa, n. s., Newberry, 1876, pl. iii, figs. 4, 4 *a* 140–141
Lamna texana, Rœmer 141
Oxyrhina mantelli, Agass. 141
Otozamites macombii, n. s., Newberry, 1876, pl. iv, figs. 1, 2, pl. vi, figs. 5, 5 *a* 141–142
Zamites occidentalis, n. s., Newberry, 1876, pl. v, figs. 1, 1 *a*, and 2 142–143
Pecopteris bullatus, Bunbury, pl. vi, figs. 1, 1 *a* 143
Pecopteris mexicana, n. s., Newberry, 1876, pl. vi, figs. 2, 2 *a* 143–144
Pecopteris falcatus, Emmons, pl. vi, fig. 3 144
Pterophyllum fragile, n. s., 1876, Newberry, pl. vi, figs. 6, 6 *a* 144
Pterophyllum robustum, n. s., Newberry, 1876, pl. vi, fig. 7 145
Podozamites cramifolia, n. s., Newberry, 1876, pl. vi, fig. 10 145
Alethopteris whitnei, n. s., Newberry, 1876, pl. vii, figs. 1, 1 *a*, *b* 145–146
Camptopteris remondi, n. s., Newberry, 1876, pl. vii, figs. 2, 2 *a* 146–147
Tæniopteris elegans, n. s., Newberry, 1876, pl. viii, fig. 1 147
Tæniopteris glassopteroides, n. s., Newberry, 1876, pl. viii, figs. 2, 2 *a* 147
Tæniopteris magnifolia, Rogers, pl. viii, figs. 3, 4 147–148
Jeanpaulia radiata, n. s., Newberry, 1876, pl. viii, fig. 6 148

X.—THE WRITINGS OF DAVID DALE OWEN.

1.

EN, D. D. Description of some organic remains figured in this work, supposed to be new. <Rep. Geol. Expl. of part of Iowa, Wisconsin, and Illinois, by David Dale Owen. Appendix, pp. 69–86, pls. xi–xviii and p. 33, pl. vii. Washington, 1844.

	Page.
Catenipora escharoides, pl. vii, fig. 2	33
Pentamerus oblongus, pl. vii, fig. 3	33
Pentamerus hupodus, pl. vii, fig. 3	33
APPENDIX.	
Cyathopora iowensis, n. s., D. D. Owen, 1844, pl. xi	69
Orthoceras undulatum, n. s., D. D. Owen, 1844, pl. xii, fig. 6	69
Gyroceras cornutes, n. s., D. D. Owen, 1844, pl. xii, fig. 8	69
Delthyris euruteines, n. s., D. D. Owen, 1844, pl. xii, fig. 9	69
Anthophyllum expansum, n. s., D. D. Owen, 1844, pl. xiii, fig. 3	69
Lunulites? dactioloides, n. s., D. D. Owen, 1844, pl. xiii, fig. 4	69
Cyathophyllum caliculare, n. s., D. D. Owen, 1844, pl. xiii, fig. 5	69
Cyathophyllum corinthium, n. s., D. D. Owen, 1844, pl. xiii, fig. 6	69
Cyathophyllum undulatum et multiplicatum, n. s., D. D. Owen, 1844, pl. xiii, fig. 10	69
Sarcinula (Porites?) glabra, n. s., D. D. Owen, 1844, pl. xiii, fig. 11	70
Lamellopora	70
L. infundibularia, n. s., D. D. Owen, 1844, pl. xiv, fig. 1	70
Astrea mamillaris, n. s., D. D. Owen, 1844, pl. xiv, fig. 3	70
Astrea? gigas, n. s., D. D. Owen, 1844, pl. xiv, fig. 7	70
Lingula iowensis, n. s., D. D. Owen, 1844, pl. xv, fig. 1	70
Orthoceras marginale, n. s., D. D. Owen, 1844, pl. xvi, fig. 6	70
Cyrtoceras conicum, n. s., D. D. Owen, 1844, pl. xvi, fig. 9	70
Strophomena convexa, n. s., D D. Owen, 1844, pl. xvii, fig. 2	70
Orbitulites? reticulata, n. s., D. D. Owen, 1884, pl. xviii, fig. 7	70
Atrypa limitaris,? Vanuxem, pl. xii, fig. 1	74
Atrypa prisca, Hengevien, pl. xii, fig. 2	74
Calymene bufo, Green, pl. xii, fig. 3	74
Atrypa? ——, pl. xii, fig. 4	74
Delthyris? ——, pl. xii, fig. 5	74
Favosites polymorpha ramosa, Goldfuss, pl. xii, fig. 7	74
Atrypa prisca ——, pl. xii, fig. 10	74
Bellerophon ——, pl. xii, fig. 11	74
Nucula? ——, pl. xii, fig. 12	74
Favosites polymorpha, Goldfuss, pl. xii, fig. 13	74
Cyathophyllum helianthoides, Goldfuss, pl. xiii, fig. 1	76
Syringopora (lineata?) ——, pl. xiii, fig. 2	76
Favosites maxima,? Troost, pl. xiii, fig. 7	76
Porites? astraformis, Owen, pl. xiii, fig. 8	76
Phragmoceras ventricosum,? ——, pl. xiii, fig. 9	76
Aulopora serpens, Goldfuss, pl. xiv, fig. 2	78
Syphonia piriformis,? Golfuss, pl. xiv, fig. 4	78
Nucula minuta, Owen, pl. xiv, fig. 5	78
Cyathophyllum turbinatum? Goldfuss, pl. xiv, fig. 6	78
Cyathophyllum vesiculosum? Goldfuss, pl. xiv, fig. 8	78
Orthis, pl. xiv, fig. 9	78
Pentamerus oblongus? pl. xiv, fig. 10	78
Astrea fungiformis, pl. xiv, fig. 11	78
Sarcinula costata, Goldfuss, pl. xiv, fig. 12	78
Tubipora lamellosa, n. s., Owen, 1844, pl. xiv, fig. 13	78
Lingula iowensis, pl. xv, fig. 1	80

Page.

Bellerophon (cast), pl. xv, fig. 2 80
Orthis (cast), pl. xv, fig. 3 80
Pleurotomaria? (cast), pl. xv, fig. 4 80
Trochus lenticularis? (cast), pl. xv, fig. 5 80
Pleurotomaria (cast), pl. xv, fig. 6 80
Delthyris (cast), pl. xv, fig. 7 80
Euomphalus (cast), pl. xv, fig. 8 80
Atrypa orbicularis (cast), pl. xv, fig. 9 80
Pleurotomaria (cast), pl. xv, fig. 10 80
Orthis testudinaria? (cast), pl. xv, fig. 11 80
Bellerophon (cast), pl. xv, fig. 12 80
Illænus-Trentonensis? pl. xvi, fig. 1 82
Casts of *Strophomena*, pl. xvi, fig. 2 82
Casts of *Strophomena*, *Orthis*? and *Atrypa*, pl. xvi, fig. 4 82
Cyathophyllum profundum, Con., pl. xvi, fig. 5 82
Pleurotomaria? pl. xvi, fig. 7 82
Siliceous casts of *Strophomena deltoidea*, pl. xvi, fig. 8 82
Orthis, pl. xvii, fig. 1 84
Pleurotomaria? pl. xvii, fig. 3 84
Atrypa, pl. xvii, fig. 4 84
Strophomena serica? pl. xvii, fig. 5 84
Strophomena deltoidea, pl. xvii, fig. 6 84
Paradoxides? pl. xvii, fig. 7 84
Cardium iowensis, n. s., Owen, 1844, pl. xvii, fig. 8 84
Thaleops? pl. xvii, fig. 9 84
Strophomena nasuta? pl. xvii, fig. 10 84
Ceraurus, pl. xvii, fig. 11 84
Cyprioardites, pl. xvii, fig. 12 84
Pleurotomaria, pl. xvii, fig. 13 84
Delthyris expansus, pl. xvii, fig. 14 84
Bellerophon bilobatus, pl. xvii, fig. 15 84
Strophomena, pl. xviii, fig. 1 86
Asaphus, pl. xviii, fig. 2 86
Strophomena angulata? pl. xviii, fig. 3 86
Pleurotomaria? pl. xviii, fig. 4 86
Pleurotomaria angulata? pl. xviii, fig. 5 86
Pleurotomaria lenticularis, pl. xviii, fig. 6 86
Trochus? pl. xviii, fig. 7 86
Orthoceras, pl. xviii, fig. 9 86
Phragmoceras? pl. xviii, fig. 11 86

2.

OWEN, D. D. On the Geology of the Western States of North America. <Quart. Journ. Geol. Soc., London. Vol. ii, pp. 433–447, pl. xix. London, 1846.

This article, of which an abstract was given in the Proc. Geol. Soc., London., vol. iv, p. 1. contains many paleontological notes.

Page.

Pentremites pyriformis, Say 437
Archimedes, Lesueur 437
Retepora archimedes 437
Aulopora tubeformis 442
Retepora indianensis, n. s., Owen, 1846 442

3.

OWEN, D. D. [Lists of fossils found.] <Rep. of a Geol. Recon. of the Chippewa land district of Wisconsin. 30th Congress, 1st session, Senate, Executive Doc. No. 57. Appendix, pp. 131–133. Washington, 1848.

Page.

List of fossil genera found in the lower sandstones of Wisconsin, fig. 1, species undetermined 131
List of fossil genera found in the lower magnesian limestone, fig. 2, species undetermined 131

Page.
List of fossil genera and species found in the lower fossiliferous limestone at St. Peter's and Fort Snelling, which are identical with those occurring in the blue limestone of the Ohio Valley 131–132
List of organic remains found near the "Big Spring," on the Upper Iowa River. . 132
List of organic remains found in the limestones (fig. 3) of Turkey River, near the agency and the vicinity 133

4.

OWEN, D. D., *and* SHUMARD, B. F. Descriptions of fifteen new species of Crinoidea from the subcarboniferous limestone of Iowa, collected during the U. S. Geological Survey of Iowa, Wisconsin, and Minnesota, in the years 1848–'49. <Journ. Acad. Nat. Sci., Philadelphia. Second series, vol. ii, part i, pp. 57–70, pl., vii. Philadelphia, 1850.

This article was afterward republished in Owen's U. S. Geol. Rep. of Iowa, Wisconsin, and Minnesota.

Page.
Platycrinus, Miller 57
P. planus, n. s., Owen & Shumard, 1850, pl. vii, figs. 4 *a–c* 57–58
P. yandellii, n. s., Owen & Shumard, 1850, pl. vii, figs. 6 *a, b* 58
P. discoideus, n. s., Owen & Shumard, 1850, pl. vii, figs. 1 *a, b* 58–59
P. corrugatus, n. s., Owen & Shumard, 1850, pl. vii, figs. 2 *a–c* 59–60
P. burlingtonensis, n. s., Owen & Shumard, 1850, pl. vii, fig. 5 60–61
Dichocrinus. Munster 61
D. ornatus, n. s., Owen & Shumard, 1850, pl. vii, figs. 9 *a, b* 61–62
D. striatus, n. s., Owen & Shumard, 1850, pl. vii, figs. 10 *a, b* 62–63
Cyathocrinus, Miller 63
C. iowensis, n. s., Owen & Shumard, 1850, pl. vii, figs. 11 *a–c* 63
C. cornutus, n. s., Owen & Shumard, 1850, pl. vii, figs. 8 *a, b* 63–64
Pentremites, Say 64
P. norwoodii, n. s., Owen & Shumard, 1850, pl. vii, figs. 13 *a–c* 64–65
P. melo, n. s., Owen & Shumard, 1850, pl. vii, figs. 14 *a–c* 65–66
P. laterniformis, n. s., Owen & Shumard, 1850, pl. vii, fig. 15 66
P. stelliformis, n. s., Owen & Shumard, 1850, pl. vii, fig. 16 *a, b* 67
Actinocrinus unicornus, n. s., Owen & Shumard, 1850, pl. vii, figs. 12 *a, b* 67–68
Actinocrinus eransii, n. s., Owen & Shumard, 1850, pl. vii, figs. 3 *a, b* 68–69

5

OWEN, D. D., *and* SHUMARD, B. F. On the Number and Distribution of Fossil Species in the Palæozoic Rocks of Iowa, Wisconsin, and Minnesota. <Proc. Amer. Ass. Adv. Sci., fifth meeting, 1851. pp. 235–239. Washington and Cincinnati, 1851.

6.

OWEN, D. D., *and* SHUMARD, B. F. Description of seven new species of Crinoidea from the subcarboniferous limestone of Iowa and Illinois. < Journ. Acad. Nat. Sci., Philadelphia. Second series, vol. ii, part ii, pp. 89–94, pl. xi. Philadelphia, 1852.

This article was afterward republished in Owen's U. S. Geol. Rep. of Wisconsin, Iowa, and Minnesota.

Page.
Platycrinus. Miller 89
P. americanus, n. s., Owen & Shumard, 1852, pl. xi, figs. 1 *a, b* 89
Poteriocrinus, Miller 89
P. rhombiferus, n. s., Owen & Shumard, 1852, pl. xi, figs. 2 *a–c* 89–90
P. tumidus, n. s., Owen & Shumard, 1852, pl. xi, figs. 3 *a, b* 90–91
P. spinosus, n. s., Owen & Shumard, 1852, pl. xi, fig. 4 91–92
P. occidentalis, n. s., Owen & Shumard, 1852, pl. xi, figs. 5 *a, b* 92–93
Agassizocrinus, Troost in MSS 93
A. conicus, n. s., Owen & Shumard, 1852, pl. xi, fig. 6 93
Synbathocrinus dentatus, n. s., Owen & Shumard, 1852, pl. xi, figs. 7 *a, b* 93–9

7.

OWEN, D. D. Description of new and imperfectly known Genera and Species of Organic Remains, collected during the geological surveys of Wisconsin, Iowa and Minnesota. < Rep. Geol. Surv. of Wisconsin, Iowa, and Minnesota, and incidentally of a part of Nebraska Territory, by David Dale Owen. Appendix, Article I, pp. 573–587, pls. i–id, ii–iib, iii–iiia, iv–v, vii–viiia. Philadelphia, 1852.

	Page.
Crustacea (Trilobites).	
Dike[l]locephalus, n. g., D. D. Owen, 1852	573–574
D. minnesotensis, n. s., D. D. Owen, 1852, tab. i, figs. 1, 2, 10; tab. i A, figs. 3, 6	574
D. pepinensis, n. s., D. D. Owen, 1852, tab. i, fig. 9 *a*, *b*, fig. 13 (*l*) and tab. i, A, fig. 17 (*l*)	574
D. miniscumsis, n. s., D. D. Owen, 1852, tab. i, figs. 3, 12, and tab. i A, figs. 4, 5	574–575
D. iowensis, n. s., D. D. Owen, 1852, tab. i, fig. 4, and tab. i A, fig. 13	575
D. granulosus, n. s., D. D. Owen, 1852, tab. i, figs. 7 (and 5 ?)	575
Lonchocephalus, n. g., D. D. Owen, 1852, tab. i A, fig. 12	575
L. chippewäensis, n. s., D. D. Owen, 1852, tab. i, figs. 6, 14; tab. i A, fig. 9	576
L. hamulus, n. s., D. D. Owen, 1852, tab. i A, figs. 8–12	576
Orepicephalus, n. g., D. D. Owen, 1852	576–577
Menocephalus, n. g., D. D. Owen, 1852, tab. i, fig. 11	577
Asaphus (Isotelus) iowensis, D. D. Owen, 1852, tab. ii A, figs. 1–7	577
Cephalopoda	577
Ammonites nebrascensis, n. s., D. D. Owen, 1852, tab. viii, fig. 3, and tab. viii A, fig. 2	577–578
Ammonites nebrascensis (?) D. D. Owen, 1852, tab. viii, fig. 2	578
Ammonites cheyennensis, n. s., D. D. Owen, 1852, tab. vii, fig. 3	578–579
Ammonites opalus, n. s., D. D. Owen, 1852, tab. viii, fig. 6	579
Ammonites moreauensis, n. s, D D. Owen, 1852, tab. viii, fig. 7	579
Ammonites lenticularis, D. D. Owen, tab. viii, fig. 5	579
Scaphites of Parkinson	579–580
S. (Ammonites?) comprimus, n. s., D. D. Owen, 1852, tab. vii, fig. 4	580
S. (Ammonites?) nodosus, n. s., D. D. Owen, 1852, tab. viii, fig. 4	581
Gyroceras burlingtonensis, n. s., D. D. Owen, 1852, tab. v, fig. 10	581
Discites tuberculatus, n. s., D. D. Owen, 1852, tab. v, fig. 14	581
Gasteropoda	581
Pleurotomaria muralis, n. s., D. D. Owen, 1852, tab. ii, fig. 6	581
Straparollus (Euomphalus) minnesotensis, n. s., D. D. Owen, 1852, tab. ii, figs. 12, 13	581
Conchifera	582
Inoceramus sagensis, n. s., D. D. Owen, 1852, tab. vii, fig. 3	582
Inoceramus nebrascensis, n. s., D. D. Owen, 1852, tab. viii, fig. 1	582
Cucullæa nebrascensis, n. s., D. D. Owen, 1852, tab. vii, fig. 1, 1 *a*	582
Brachiopoda	583
Lingula pinnaformis, n. s., D. D. Owen, 1852, tab. i B, figs. 4, 6, 8	583
Lingula ampla, n. s., D. D. Owen, 1852, tab. i B, fig. 5	583
Orbicula prima, n. s., D. D. Owen, 1852, tab. i B, figs. 17, 19, and top figures on tab. iv	583
Atrypa comis, n. s., D. D. Owen, 1852, tab. iii A, fig. 4	583
Chonetes granulifera, n. s., D. D. Owen, 1852, tab. v, fig. 12	583
Chonetes (?) iowensis, n. s., D. D. Owen, 1852, tab. iii A, fig. 7	584
Productus nebrascensis, n. s., D. D. Owen, 1852, tab. v, fig. 3	584
Leptæna trilobata, n. s., D. D. Owen, 1852, tab. ii, figs. 17, 18	584
Strophodonta, Hall	584
S. parva, n. s., D. D. Owen, 1852, tab. iii A, fig. 9	584
S. (?) costata, n. s., D. D. Owen, 1852, tab. iii A, fig. 5	585
S. iowensis, n. s., D. D. Owen, 1852	585
Orthis cuneata, n. s., D. D. Owen, 1852, tab. iii A, fig. 10	585
Spirifer iowensis, n. s., D. D. Owen, 1852, tab. iii, fig. 1	585
Spirifer pennatus, n. s., D. D. Owen, 1852, tab. iii, figs. 3 and 8 (*l*)	585
Spirifer ligus, n. s., D. D. Owen, 1852, tab. iii, fig. 4	585
Spirifer euruteines, D. D. Owen, tab. iii, figs. 2, 2 *a*, and 6, 6 *a*	586
Spirifer cedarensis, D. D. Owen, 1852, tab. iii, fig. 5	586
Spirifer inequicostatis, n. s., D. D. Owen, 1852, tab. v, fig. 6	586
Foraminifera	586
Selenoides, n. g., D. D. Owen, 1852, fig. 3, *a* (and *b*?)	586
S. iowensis, n. s., D. D. Owen, 1852, tab. ii B, fig. 13	587

8.

OWEN, D. D., and SHUMARD, B. F. Descriptions of one New Genus and twenty-two New Species of Crinoidea, from the subcarboniferous limestone of Iowa. <Rep. Geol. Surv. of Wisconsin, Iowa, and Minnesota, and incidentally of a part of Nebraska territory, by David Dale Owen. Appendix. Article II, pp. 587–598, pls. V*a*–V*b*. Philadelphia, 1852.

	Page.
Platycrinus, Miller	587
P. planus, Owen & Shumard, 1850, tab. v A, figs. 4 *a–c*	587
P. yandellii, Owen & Shumard, 1850, tab. v A, figs. 6 *a, b*	587–588
P. discoideus, Owen & Shumard, 1850, tab. v A, figs. 1 *a, b*	588
P. corrugatus, Owen & Shumard, 1850, tab. v A, figs. 2 *a–e*	589
P. burlingtonensis, Owen & Shumard, 1850, tab. v A, fig. 5	589
Dichocrinus, Munster	589–590
D. ovatus, Owen & Shumard, 1850, tab. v A, figs. 9 *a, b*	590
D. striatus, Owen & Shumard, 1850, tab. v A, figs. 10 *a, b*	590
Cyathocrinus, Miller	591
C. iowensis, Owen & Shumard, 1850, tab. v A, figs. 11 *a–c*	591
C. cornutus, Owen & Shumard, 1850, tab. v A, figs. 8 *a, b*	591
Pentremites, Say	591
P. norwoodii, Owen & Shumard, 1850, tab. v A, figs. 13 *a–e*	591–592
P. melo, Owen & Shumard, 1850, tab. v A, figs. 14 *a–c*	592
P. laterniformis, Owen & Shumard, 1850, tab. v A, fig. 15	592–593
P. stelliformis, Owen & Shumard, 1850, tab. v A, figs. 16 *a, b*	593
Actinocrinus unicornus, Owen & Shumard, 1850, tab. v A, figs. 12 *a, b*	593–594
Megistocrinus, n. g., Owen & Shumard, 1852	594
M. evansii, n. s., Owen & Shumard, 1852, tab. v A, figs. 3 *a, b*	594
Platycrinus, Miller	594
P. americanus, Owen & Shumard, 1852, tab. v B, figs. 1 *a, b*	594–595
Poteriocrinus, Miller	595
P. rhombiferus, Owen & Shumard, 1852, tab. v B, figs. 2 *a–c*	595
P. tumidus, Owen & Shumard, 1852, tab. v B, figs. 3 *a, b*	595–596
P. spinosus, Owen & Shumard, 1852, tab. v B, fig. 4	596
P. occidentalis, Owen & Shumard, 1852, tab. v B, figs. 5 *a, b*	596–597
Agassizocrinus (Troost in MSS)	597
A. conicus, Owen & Shumard, 1852, tab. v B, fig. 6	597
Synbathocrinus dentatus, Owen & Shumard, 1852, tab. v B, figs. 7 *a, b*	597–598

9.

OWEN, D. D. Shumard, B. F. Summary of the distribution of Orders, Genera, and Species, in the Northwest. <Rep. Geol. Surv. of Wisconsin, Iowa, and Minnesota, and incidentally of a part of Nebraska Territory, by David Dale Owen. Appendix. Article III, pp. 598–600. Philadelphia, 1852.

Modified by additions and researches since the publication in the Proc. of the American Association, 1851.

XI.—THE WRITINGS OF JAMES SCHIEL.

SCHIEL, JAMES. List and Description of Organic Remains collected during the Exploration of the Central Pacific Railroad line, 1853–'54. <Rep. Expls. and Survs. from the Mississippi River to the Pacific Ocean. Report of Expls. for a route for the Pacific Railroad of the line of the forty-first parallel of north latitude, by Lieut. E. G. Beckwith, 1854. Vol. ii, chap. x, pp. 108–109, pls. i–iv. Washington, 1855.

	Page.
Fenestella, pl. i, fig. 1	108
Brachiopoda.	
Terebratula subtilita, Hall, pl. i, figs. 2 *a*, *b*	108
Productus splendens, Norwood & Prather, pl. i, fig. 3	108
Productus æquicostatus, Shumard, pl. ii, figs. 4, 5	108
Spirifer, pl. i, fig. 5	108
Inoceramus, pl. ii, fig. 6	108
Inoceramus confertim-annulatus, Rœmer, pl. ii, fig. 7	108
Inoceramus pseudo-mytiloides, pl. iii, fig. 8	108
Gryphæa pitcheri, Morton, pl. iii, fig. 9	108
Cardium multistriatum, Shumard, pl. i, fig. 10	109
Phillipsia —— ?, pl. i, figs. 11–14	109
Encrinites and bryozoa, pl. i, fig. 12	109
Ammonites	109
Gryphæa pitcheri	109

XII.—THE WRITINGS OF BENJAMIN F. SHUMARD.

1.

SHUMARD, B. F. Description of the species of Carboniferous and Cretaceous fossils collected. <Expl. of the Red River of Louisiana, by Randolph B. Marcy, assisted by George B. McClellan. Appendix E, Paleontology, pp. 197–211, pls. i–vi. Washington, 1853.

FOSSILS OF THE CARBONIFEROUS SYSTEM.

	Page.
Orinoidea.	
Cyathocrinus granuliferus, Yandell & Shumard, MSS., pl. —, fig. —	199
Agassizocrinus dactyliformis, Troost, MSS., pl. i, fig. 7	199–209
Pentremites florealis, Say, 1820	200
Pentremites sulcatus, F. Roemer, 1852	200
Bryozoa.	
Archimedipora archimedes, Lesueur, 1842, pl. i, fig. 6	201
Brachiopoda.	
Productus punctatus, Martin, pl. i, fig. 5 and pl. ii, fig. 1	201
Productus cora, D'Orbigny, 1842	202
Productus costatus, Sowerby, pl. i, fig. 2	202
Terebratula subtilita, Hall, pl. iv, fig. 8	202–203
Terebratula marcyi, Shumard, n. s., 1853, pl. i, figs. 4 *a*, *b*	203
Spirifer ——? Shumard, 1853, pl i, fig. 3	203

FOSSILS OF THE CRETACEOUS PERIOD.

	Page.
Mollusca.	
Pecten quadricostatus, Sowerby, pl. iii, fig. 6; pl. —, fig. —	204
Exogyra ponderosa, Roemer, 1849	205
Gryphæa pitcheri, Morton, pl. vi, fig. 5	205
Exogyra texana, Roemer, pl. v, figs. 1 *a*, *b* and fig. 5	205
Ostrea subovata, n. s., Shumard, 1853, pl. v, fig. 2	205, 206
Inoceramus confertim-annulatus, Roemer, pl. vi, fig. 2	206
Trigonia crenulata, Lamarck, pl. iv, fig. 1	206
Astarte washitensis, n. s., Shumard, 1853, pl. iii, fig. 3	206, 207
Cardium multistriatum, n. s., Shumard, 1853, pl. iv, fig. 2	207
Panopæa texana, n. s., Shumard, 1853, pl. vi, fig. 1	207
Terebratula choctawensis, n. s., Shumard, 1853, pl. ii, figs, *a*, *b*	207–208
Globiconcha (Tylostoma) tumida, n. s., Shumard, 1853, pl. v, fig. 3	208
Globiconcha (?) elevata, n. s., Shumard, 1853, pl. iv, fig. 4	208
Eulima (?) subfusiformis, n. s., Shumard, 1853, pl. iv, fig. 3	208
Ammonites vespertinus, Morton	209
Ammonites marciana, n. s., Shumard, 1853, pl. iv, fig. 5	209
A. acuto carinatus, n. s., Shumard, 1853, pl. i, fig. 3	209–210
Ammonites ——? Shumard, 1853, pl. —, fig. —	210
Echinodermata.	
Hemiaster eleganas, n. s., Shumard, 1853, pl. ii, figs. 4 *a–c*	210
Holaster simplex, n. s., Shumard, 1853, pl. iii, fig. 2	210–211
Holectypus planatus, F. Roemer	211

2.

EVANS, JOHN, *and* SHUMARD, B. F. On some New Species of Fossils from the Cretaceous formation of Nebraska territory. <Trans. Saint Louis Acad. Sci., vol. i, pp. 38–42. 1857. Saint Louis, 1856–1860.

	Page.
Acephala.	
Avicula nebrascana, n. s., E. & S., 1857	38
Limopsis striato-punctatus, n. s., E. & S., 1857	38

	Page.
Cardium subquadratum, n. s., E. & S., 1857	38–39
Cardium rarum, n. s., E. & S., 1857	39
Arca sulcatina, n. s., E. & S., 1857	39
Leda fibrosa, n. s., E. & S., 1857	39–40
Mytilus meekii, n. s., E. & S., 1857	40
Ostrea subtrigonalis, n. s., E. & S., 1857	40
Gasteropoda.	
Pleurotoma minor, n. s., E. & S., 1857	40–41
Fusus haydeni, n. s., E. & S., 1857	41
Fusus nebrascensis n. s., E. & S., 1857	41
Turritella multilineata, n. s., E. & S., 1857	41–42
Rostellaria americana, n. s., E. & S., 1857	42
Cephalopoda.	
Ammonites galpini, n. s., E. & S., 1857	42

4.

SHUMARD, B. F. Descriptions of New Fossils from the Tertiary Formation of Oregon and Washington Territories and the Cretaceous of Vancouver's Island, collected by Dr. Jno. Evans, U. S. Geologist, under instructions from the Department of the Interior. <Trans. Saint Louis Acad. Sci., vol. i, pp. 120–125. 1858. Saint Louis, 1856–1860.

TERTIARY SPECIES.

	Page.
Lucina fibrosa, n. s., Shumard, 1858	120
Corbula eransana, n. s., Shumard, 1858	120–121
Leda willamettensis, n. s., Shumard, 1858	121
Leda oregona, n. s., Shumard, 1858	121–122
Pecten coosensis, n. s., Shumard, 1858	122
Venus securis, n. s., Shumard, 1858	122–123

CRETACEOUS SPECIES.

Inoceramus vancouverensis, n. s., Shumard, 1858	124–125
Pinna calamitoides, n. s., Shumard, 1858	124
Pyrula glabra, n. s., Shumard, 1858	125

5.

SHUMARD, B. F. Notice of New Fossils from the Permian Strata of New Mexico and Texas, collected by Dr. George G. Shumard, Geologist of the United States Government Expedition for obtaining Water by means of Artesian Wells along the 32d Parallel, under the direction of Capt. John Pope, U. S. Corps Top. Eng. <Trans. Saint Louis Acad. Sci., vol. i, pp. 290–297. 1858. Saint Louis, 1856–1860

	Page
Productus popei, n. s., Shumard, 1858	290
P. mexicanus, n. s., Shumard, 1858	291
P. pileolus, n. s., Shumard, 1858	291
P. semireticulatus, Mart., sp	292
Aulosteges guadalupensis, n. s., Shumard, 1858	292
Spirifer mexicanus, n. s., Shumard, 1858	292–293
Spirifer subtilis, n. s., Shumard, 1858	293
Spiriferina billingsii, n. s., Shumard, 1858	294
Retzia papillata, n. s., Shumard, 1858	294–295
Retzia ? meekana, n. s., Shumard, 1858	295
Rhynchonella guadalupæ, n. s., Shumard, 1858	295–296
Camarophoria ? bisulcata, n. s., Shumard, 1858	296
Phillipsia perannulata, n. s., Shumard, 1858	296–297
Fusulina elongata, n. s., Shumard, 1858	297

6.

SHUMARD, B. F. Notice of Fossils from the Permian Strata of Texas and New Mexico, obtained by the United States Expedition, under Capt. John Pope, for boring Artesian Wells along the 32d Paral., with Descriptions of New Species from these Strata and the Coal Measures of that region. <Trans. Saint Louis Acad. Sci., vol. i, pp. 387–403, 1859, pl. xi. Saint Louis, 1856–1860.

PERMIAN FOSSILS.

	Page.
Zoophyta.	
Chaetetes machrothii, Geinitz	387
Chaetetes, sp. (?) Shumard, 1859	388
Campophyllum (?) *texanum*, n. s., Shumard, 1859	388
Polycoelia ?, Shumard, 1859	388
Crustacea.	
Phillipsia perannulata, Shumard, pl. xi, fig. 10	388
Beirdia, sp. (?), Shumard, 1859	388
Bryozoa	388
Fenestella popeana, Prout	388
Acanthocladia americana, Swallow	388
Foraminifera.	
Fusulina elongata, Shumard	388–389
Brachiopoda.	
Productus	389
P. calhounianus, Swallow	389
P. mexicanus, Shumard	389
P. pileolus, Shumard	389
P. semireticulatus var. *antiquatus*, Martin	389
P. popei, Shumard, pl. xi, figs. 8*a*, *b*	389
P. norwoodii, Swallow	389–390
P. leplayi (?), Verneuil	390
Strophalosia	390
S. (*Aulosteges*) *guadalupensis*, Shumard, pl. xi, figs. 5*a*, *b*	390
Chonetes	390
C. permiana, n. s., Shumard, 1859	390
C. flemingi (?), Norwood & Pratten	390
Spirifer	390
S. mexicanus, Shumard, pl. xi, figs. 4*a*, *b*	390–391
S. guadalupensis, n. s., Shumard, 1859	391
S. suloiferus, Shumard, pl. xi, figs. 3*a–c*	391
S. cameratus, Morton	391
Spiriferina	391
S. billingsii, Shumard	391–392
Terebratula	392
T. elongata, Schlotheim	392
T. perinflata, n. s., Shumard, 1859	392
Rhynchonella	392
R. guadalupæ, Shumard, pl. xi, figs. 6*a–c*	392
R. indentata, n. s., Shumard, 1859	392
R. texana, n. s., Shumard, 1859	393
Rhynchonella, sp. (?), Shumard, 1859	393–394
Camerophoria, Swallow, pl. xi, figs. 1*a–c*	394
C. bisulcata, Shumard, pl. xi, figs. 2*a–d*	394
C. swallowiana, n. s., Shumard, 1859, pl. xi, fig. 1 *a–c*	394–395
C. schlotheimi (?), Buch	395
Retzia	395
R. papillata, Shumard, pl. xi, figs. 9 *a–c*	395
R. meekiana, Shumard, pl. xi, figs. 7 *a*, *b*	395
Streptorhynchus	395
S. (*Orthisina*) *shumardianus*, Swallow	395
Orthisina	395
Orthisina sp. (?), Shumard, 1859	395
Crania	395
C. permiana, n. s., Shumard, 1859	395–396

Page.

Acephala.
Myalina ... 396
M. squamosa, Sow ... 396
M. recta, Shumard ... 396
Pleurophorus ... 396
P. occidentalis, M. & H ... 396
Monotis ... 396
M. speluncaria, Schlotheim ... 396-397
Monotis, sp. (?), Shumard, 1859 ... 397
Axinus ... 397
A. securis, n. s., Shumard, 1859 ... 397
Edmondia ... 398
E. suborbiculata, Swallow ... 398
Cardiomorpha ... 398
Cardiomorpha, sp. (?) Shumard, 1859 ... 398
Gasteropoda.
Turbo ... 398
T. guadalupensis, n. s., Shumard, 1859 ... 398
T. helicinus (?), Schlotheim ... 398
Straparollus ... 398
Straparollus, sp. (?), Shumard, 1859 ... 398
Belerophon ... 398
Bellerophon, sp. (?), Shumard, 1859 ... 399
Pleurotomaria ... 399
P. halliana, n. s., Shumard, 1859 ... 399
Chemnitzia ... 399
C. swalloviana, n. s., Shumard, 1859 ... 399
Cephalopoda.
Nautilus, sp. (?), Shumard, 1859 ... 399-400
Orthoceras, sp. (?), Shumard, 1859 ... 400

CARBONIFEROUS FOSSILS.

Gasteropoda.
Turbo texanus, n. s., Shumard, 1859 ... 400
Straparollus cornudanus, n. s., Shumard, 1859 ... 400-401
Pleurotomaria proutiana, n. s., Shumard, 1859 ... 401
Pleurotomaria obtusispira, n. s., Shumard, 1859 ... 401
Pleurotomaria perornata, n. s., Shumard, 1859 ... 401-402
Macrocheilus texanus, n. s., Shumard, 1859 ... 402

7.

SHUMARD, B. F., *and* OWEN, D. D. (See Owen, D. D., and Shumard, B. F.).

XIII.—THE WRITINGS OF ROBERT P. WHITFIELD.

1.

WHITFIELD, R. P. Descriptions of New Fossils. <Rep. of a reconnaissance of the Black Hills of Dakota, by William Ludlow, pp. 103-104, pl. i. Washington, 1875.

	Page.
Obolus	103
O. pectenoides, n. s., Whitfield, 1875, pl. —, figs. 1–3	103
Lingulepis primaformis? pl. —, fig. 4	103
Terebratula	103
T. helena, n. s., Whitfield, 1875, pl. —, figs. 5–10	103–104

2.

WHITFIELD, R. P. Descriptions of New Species of Fossils. <Rep. of a reconnaissance from Carroll, Montana Territory, on the Upper Missouri, to the Yellowstone National Park, and return, by William Ludlow. pp. 139–145, pls. i–ii. Washington, 1876.

	Page.
Orepicephalus, Owen	141
O. (Loganellus) montanensis, n. s., Whitfield, 1876, pl. i, figs. 1, 2	141
Arionellus, Barrande	141
A. tripunctatus, n. s., Whitfield, 1876, pl. i, figs. 3–5	141–142
Gryphæa, Lam	142
G. planoconvexa, n. s., Whitfield, 1876, pl. ii, figs. 9, 10	142
Gervillia, Defrance	142
G. sparsalirata, n. s., Whitfield, 1876, pl. ii, fig. 8	142
Myalina, De Koninck	143
M.? (Gervillea) perplana, n. s., Whitfield, 1876, pl. i, fig. 8	143
Pinna, Linn	143
P. ludlovi, n. s., Whitfield, 1876, pl. i, figs. 6, 7	143
Tapes, Mühlf	143
T. montanensis, n. s., Whitfield, 1876, pl. ii, figs. 1, 2	143–144
Mactra, Linn	144
M. maia, n. s., Whitfield, 1876, pl. ii, fig. 5	144
Sanguinolaria, Lam	144
S. oblata, n. s., Whitfield, 1876, pl. ii, figs. 3, 4	144
Thracia, Leach	144
T. (Corimya) grinnelli, n. s., Whitfield, 1876, pl. ii, figs. 6, 7	144–145
Vanikoropsis, Meek	145
V. toumeyana, M. & H., sp., 1856, pl. ii, figs. 11–13	145

3.

WHITFIELD, R. P. Preliminary report on the Paleontology of the Black Hills, containing descriptions of new species of fossils from the Potsdam, Jurassic, and Cretaceous formations of the Black Hills of Dakota. <U. S. Geographical and Geological Survey of the Rocky Mountain region, J. W. Powell in charge. pp. 1–49. Washington, July, 1877.

FOSSILS FROM THE PRIMORDIAL ROCKS.

	Page.
Plantæ.	
Palæochorda	7
P. prima, n. s., Whitfield, 1877, pl. i, fig. 3	7

Page.

Palæophycus, Hall 7
P. occidentalis, n. s., Whitfield, 1877, pl. i, fig. 3 7-8
Molluscoida.
Brachiopoda.
Lingulepis cuneolus, n. s., Whitfield, 1877, pl. ii, figs. 5, 6 8-9
Lingulepis perattenuatus, n. s., Whitfield, 1877, pl. ii, figs. 7–9 9
Articulata.
Trilobita.
Calymenidæ.
Crepicephalus, Owen, (? *Loganellus*, Devine.) 10
C. (Loganellus) centralis, n. s., Whitfield, 1877, pl. ii, figs. 21–24 10-11
C. (Loganellus) planus, n. s., Whitfield, 1877, pl. ii, fig. 20 11

FOSSILS FROM THE JURASSIC ROCKS.

Radiata.
Echinodermata.
Asteroidea.
Asterias, Linnæus 15
A. ? dubium, n. s., Whitfield, 1877, pl. iii, fig. 3 15
Pectenidæ.
Pecten, Brug 16
P. newberryi, n. s., Whitfield, 1877, pl. iv, figs. 12–15 16-17
Pseudomonotis (Eumicrotis) orbiculata, n. s., Whitfield, 1877, pl. iii, figs. 17–19 17
Mytilidæ.
Mytilus, Linn 18
M. whitei, n. s., Whitfield, 1877, pl. v, figs. 9–12 18
Trapezium, Humph. (= *Cypricardia*, Lam.) 18
T. bellafourchensis, n. s., Whitfield, 1877, pl. v, figs. 1–4 18-19
T. subequalis, n. s., Whitfield, 1877, pl. v, figs. 5–8 19-20
Pleuromya, Agassiz (family uncertain) 20
P. newtoni, n. s., Whitfield, 1877, pl. v, figs. 19–20 20-21
Tancredia corbuliformis, n. s., Whitfield, 1877, pl. vi, figs. 5–8 21-22
Tancredia bulbosa, n. s., Whitfield, 1877, pl. vi, figs. 1–3 22
Tancredia postica, n. s., Whitfield, 1877, pl. vi, fig. 14 22-23
Veneridæ.
Dosinia, Scopoli 23
D. jurassica, n. s., Whitfield, 1877, pl. v, figs. 21–24 23-24
Psammobiidæ.
Psammobia, Lam 24
P. ? prematura, n. s., Whitfield, 1877, pl. v, fig. 31 24
Neæra, Gray 24
N. longirostra, n. s., Whitfield, 1877, pl. v, fig. 35 24-25
Gastrochænidæ.
Saxicava, Bellevue 25
S. jurassica, n. s., Whitfield, 1877, pl. v, figs. 25–30 25-26

FOSSILS OF THE CRETACEOUS.

Mollusca.
Lamellibranchiata.
Pteriidæ., Meek.
Pteria, Scop. 29
P. (Pseudopteria) sublevis, n. s., Whitfield, 1877, pl. vii, fig. 6 29-31
Inoceramus perplexus, n. s., Whitfield, 1877, pl. viii, fig. 3, and pl. x, figs. 4, 5 31
Endocostea, n. g., Whitfield, 1877 31-32
E. typica, n. s., Whitfield, 1877, pl. ix, figs. 1–7 32-33
Nuculanidæ.
Nuculana 33
N. subequilatera, n. s., Whitfield, 1877, pl. xi, figs. 3, 4 33
Crassatellidæ.
Crassatella, Lam. 34
C. subquadrata, n. s., Whitfield, 1877, pl. xi, fig. 12 34
Cyprinidæ.
Sphæriola 34
S. transversa, n. s., Whitfield, 1877, pl. x, figs. 14–16 34-35

Page.
Zelkinida.
Leiopistha, Meek 35
Subgenus *Cymella*, Meek 35
Leiopistha (*Cymella*) *meeki*, n. s., Whitfield, 1877, pl. xi, figs. 27, 28 35–36
Anatinida.
Thracia, Leach 36
T. subgracilis, n. s., Whitfield, 1877, pl. xi, figs. 29–30 36
Gasteropoda.
Fusus cheyennensis, n. s., Whitfield, 1877, pl. xii, fig. 9 37
Aporrhais meeki, n. s., Whitfield, 1877, pl. xii, fig. 5 37
Aporrhais (*Goniochella*) *castorensis*, n. s., Whitfield, 1877, pl. xii, fig. 1 38
Akera, O. F. Muller 38
A. glans-oryza, n. s., Whitfield, 1877, pl. xii, fig. 25 38–39
Cephalopoda.
Helicoceras, D'Orb 39
H. stevensoni, n. s., Whitfield, 1877, pl. xiv, figs. 4–7 39–40
Heteroceras, D'Orb 40
H. newtoni, n. s., Whitfield, 1877, pl. xv, figs. 1–4 40–41
Ancyloceras, D'Orb 42
A. jenneyi, n. s., Whitfield, 1877, pl. xvi, figs. 6–8 42–43
A. tricostatus, n. s., Whitfield, 1877, pl. xv, figs. 7–8 43–44
Ptychoceras meekanum, n. s., Whitfield, 1877, pl. xvi, figs. 1–2 44–45
Ptychoceras crassum, n. s., Whitfield, 1877, pl. xvi, figs. 3–5 45–46
List of fossils described in the report of the Paleontology of the Black Hills 46–49

4.

FIELD, R. P. Paleontology of the Black Hills of Dakota. <Report on the Geology and Resources of the Black Hills of Dakota, by Henry Newton, E. M., and Walter P. Jenney, E. M. <U. S. Geographical and Geological Survey of the Rocky Mountain region, J. W. Powell in charge, pp. 325–468, pls. i–xvi. Washington, 1880.

FOSSILS FROM THE PRIMORDIAL ROCKS.

Page.
Plantæ.
Palæochorda 331
P. prima, Whitfield, 1877, pl. i, fig. 2 331–332
Palæophycus, Hall 332
P. occidentalis, Whitfield, 1877, pl. i, fig. 3 332
Palæophycus, sp.? Whitfield, 1880, pl. i, fig. 1 333
Incertæsedes.
Arenicolites, sp.? Whitfield, 1880, pl. ii, fig. 25 333–334
Brachiopoda.
Lingulidæ.
Lingulepis, Hall 335
L. pinnaformis, Owen, pl. ii, figs. 1–4 335
L. cuneolus, Whitfield, 1877, pl. ii, figs. 5–6 336
L. perattenuatus, Whitfield, 1877, pl. ii, figs. 7–9 337
L. dakotensis, M. & H., pl. ii, figs. 10–11 337–338
Obolidæ.
Obolus, Eichwald .....
O.? pectenoides, Whitfield, 1875, pl. ii, figs. 18–19 338–339
Obolella, Billings 339
O. polita, Hall, 1860, pl. ii, figs. 12, 13 339–340
O. nana, M. & H., 1861, pl. ii, figs. 14–17 340–341
Articulata.
Trilobita.
Calymenidæ.
Crepicephalus, Owen (? *Loganellus*, Devine) 341
C. centralis, Whitfield, 1877, pl. ii, figs. 21–24 341–343
C. planus, Whitfield, 1877, pl. ii, fig. 20 343–344

FOSSILS FROM THE JURASSIC ROCKS.

Radiata.
Echinodermata.
Asteroidea.
Asterias, Linn 344
A.? dubium, Whitfield, 1877, pl. iii, fig. 3 344–345

Page.

Crinoidea.
Pentacrinidæ.
Pentacrinites, Miller 345
P. asteriscus, M. & H., 1858, pl. 3, figs. 1–3 345
Brachiopoda.
Lingulidæ.
Lingula, Brug. 346
L. brevirostris, M. & H., 1858, pl. iii, figs. 4–5 346–347
Rhynchonellidæ.
Rhynchonella, Fischer 347
R. myrina, pl. iii, figs. 6–7 347
Lamellibranchiata.
Ostreidæ.
Ostrea, Linn 348
O. strigilecula, White, pl. iii, figs. 8–12 348–349
Gryphæa, Lam. 349
G. calceola var. *nebrascensis*, M. & H., 1861, pl. iii, figs. 13–16 349–350
Pectenidæ.
Pecten, Bruguières 350
P. newberryi, Whitfield, 1877, pl. iv, figs. 12–15 350–351
Camptonectes, Agassiz 351
C. bellistriatus, Meek, 1860, pl. iv, figs. 6–11 351–353
C. extenuatus, M. & H., 1860, pl. iv, figs. 4, 5 353–354
Aviculidæ.
Pseudomonotis, Bronn 354
P. (Eumicrotis) curta, Hall, 1852, pl. iii, figs. 20–25 354–356
P. (Eumicrotis) orbiculata, Whitfield, 1877, pl. iii, figs. 17–19 356–357
Avicula, Lam. 357
Subgenus *Oxytoma*, Meek 357
A. (Oxytoma) mucronata, M. & H., pl. iv, figs. 1, 2 357–358
Gervillia, DeFrance 358
G. recta, Meek, pl. iv, fig. 3 358–359
Arcidæ.
Grammatodon, M. & H 359
G. inornatus, M. & H., 1858, pl. v, figs. 16–18 359–360
Mytilidæ.
Mytilus, Linn 360
M. whitei, Whitfield, 1877, pl. v, figs. 9–12 360–361
Volsella, Scopoli 361
V. (modiola) formosa, M. & H., 1861, pl. v, fig. 15 361–362
V. pertenuis, M. & H., 1858, pl. v, figs. 13, 14 362–363
Crassatellidæ.
Astarte, Sowerby 363
A.? fragilis, M. & H., 1860, pl. v, figs. 32, 33 363–364
Trapezium, Humph. (= *Cypricardia*, Lam.) 364
T. bellefourchensis, Whitfield, 1877, pl. v, figs. 1–4 364–365
T. subequalis, Whitfield, 1877, pl. v, figs. 5–8 365–366
Pleuromya, Agassiz (family uncertain) 367
P. newtoni, Whitfield, 1877, pl. v, figs. 19, 20 367–368
Tancrediidæ.
Tancredia, Lycett (= *Hettangia*, Terquem) 368
T.? inornata, M. & H., 1860, pl. vi, figs. 9–13 368–369
T. corbuliformis, Whitfield, 1877, pl. vi, figs. 5–8 370
T. bulbosa, Whitfield, 1877, pl. vi, figs. 1–3 370–371
T. postica, Whitfield, 1877, pl. vi, fig. 14 371–372
T. warrenana, M. & H., 1860, pl. vi, fig. 4 372
Veneridæ.
Dosinia, Scopoli 373
D. jurassica, Whitfield, 1877, pl. v, figs. 21–24 373
Psammobiidæ.
Psammobia, Lam. 374
P.? prematura, Whitfield, 1877, pl. v, fig. 31 374
Anatinidæ.
Thracia, Leach 375
T.? sublevis, M. & H., 1860, pl. v. fig. 34 375

Page.
Nucra, Gray ... 376
N. longirostra, Whitfield, 1877, pl. v, fig. 35 ... 376
Gastrochænidæ.
Saxicava, Belle[v]ue ... 376
S. jurassica, Whitfield, 1877, pl. v, figs. 25–30 ... 376–377
Cephalopoda.
Tetrabranchiata.
Ammonitidæ.
Ammonites, Bruguière ... 378
A. cordiformis, M. & H., 1858, pl. vi, figs. 20–24 ... 378–380
A. cordiformis var. *distans*, Whitfield, 1880, pl. vi, fig. 25 ... 380–381
Dibranchiata.
Belemnitidæ.
Belemnites, Agricola ... 381
B. densus, M. & H., 1858, pl. vi, figs. 15–19 ... 381–382

FOSSILS FROM THE CRETACEOUS ROCKS.

Lamellibranchiata.
Monomyaria.
Pectinidæ.
Synyelonema, Meek ... 383
S. rigida, H. & M., pl. vii, fig. 1 ... 383–384
Heteromyaria.
Aviculidæ.
Pteria, Scopoli ... 384
P. linguiformis, E. & S., sp., pl. vii, figs. 2, 3 ... 384–385
P. (Oxytoma) nebrascana, E. & S., pl. vii, fig. 4 ... 385–386
P. (Pseudopteria) fibrosa, M. & H., sp., 1856, pl. vii, fig. 5 ... 386
P. (Pseudopteria) sublevis, Whitfield, 1877, pl. vii, fig. 6 ... 387
Inoceramus, Sowerby ... 389
I. problematicus? Schlot., pl. vii, fig. 11 ... 389–390
I. fragilis, H. & M., pl. ix, fig. 10 ... 390–391
I. altus, Meek, 1871, pl. ix, fig. 11 ... 391
I. perplexus, Whitfield, 1877, pl. viii, fig. 3, and pl. x, figs. 4, 5 ... 392
I. sublevis, H. & M., pl. x, figs. 1–3 ... 393
I. sagensis, Owen, 1852, pl. vii, fig. 12, and pl. viii, fig. 2 ... 393–395
I. simpsoni, Meek, 1860, pl. viii, fig. 1 ... 395–396
I. vanuxemi, M. & H., 1860, pl. vii, figs. 8, 9, and pl. viii, figs. 4, 5 ... 396–398
I. vanuxemi var.? Whitfield, 1880, pl. vii, fig. 10 ... 398
I. barabini, Morton, 1834, pl. vii, fig. 7, and pl. ix, fig. 8 ... 398–400
I. tenuilineatus, H. &. M., pl. ix, figs. 12, 13 ... 400, 402
Endocostea, Whitfield, 1877 ... 402–403
E. typica, Whitfield, 1877, pl. ix, figs. 1–7 ... 403–404
E. sulcata, Roemer, sp., pl. x, fig. 6 ... 404–405
Integropallia.
Arcidæ.
Subgenus *Idonearca*, Conrad ... 405
Idonearca shumardi, M. & H., pl. xi, figs. 8–11 ... 405–406
Nucula, Lam. ... 406
N. planimarginata, M. & H., 1856, pl. xi, figs. 5, 6 ... 406–407
Nuculana, Link ... 407
N. bivulcata, M. & H., 1861, pl. xi, fig. 7 ... 407–408
N. subequilatera, Whitfield, 1877, pl. xi, figs. 3, 4 ... 408
Yoldia, Möller ... 409
Y. evansi, M. & H., 1866, pl. xi, figs. 1, 2 ... 409
Lucinidæ.
Lucina, Bruguière ... 409
L. occidentalis, Morton, pl. xi, figs. 19–21 ... 409–410
L. ventricosa, H. & M., pl. xi, figs. 14–16 ... 410–411
L. (Diplodonta?) subundata, H. & M., pl. xi, figs. 17, 18 ... 411–412
Crassatellidæ.
Crassatella, Lam. ... 412
C. subquadrata, Whitfield, 1877, pl. xi, fig. 12 ... 412–413
Astarte, Sowerby ... 413
A. evansi, H. & M., pl. xi, fig. 13 ... 413

	Page.
Ventelliidæ.	
Veniella, Stoliczka	414
V. humilis, M. & H., 1860, pl. x, figs. 7–13	414
Sphæriola	415
S. transversa, Whitfield, 1877, pl. x, figs. 14–16	415
Sinuopallia.	
Venusidæ.	
Dosinia, Scopoli	416
D. missouriana? Morton, pl. xi, figs. 25, 26	416–417
Thetis, Linn	417
T. circularis, M. & H., 1856, pl. xi, figs. 21–24	417
Family ?	
Leiopistha, Meek	418
Subgenus *Cymella*, Meek	418
L. (Cymella) meeki, Whitfield, 1877, pl. xi, figs. 27, 28	418–419
Anatinidæ.	
Thracia, Leach	419
T. subgracilis, Whitfield, 1877, pl. xi, figs. 29, 30	419–420
Neæra, Gray	420
N. moreauensis, M. & H., pl. xi, fig. 31	420
Gasteropoda.	
Siphonostomata.	
Fasciolariidæ.	
Fasciolaria, Lam.	421
F. (Cryptorhytis) fusiformis, H. & M., pl. xii, fig. 12	421–422
F. (Cryptorhytis) contorta, M. & H., pl. xii, fig. 10	422–423
F. (Plesiocheilus) culbertsoni, M. & H., pl. xii, fig. 11	423–424
Fusus, Lam.	424
F. shumardi, H. & M., pl. xii, figs. 7, 8	424
F. cheyennensis, Whitfield, 1877, pl. xii, fig. 9	424–425
Aporrhaidæ.	
Aporrhais, Dillwyn	425
A. newberryi, Meek, pl. xii, fig. 4	425–426
A. meeki, Whitfield, 1877, pl. xii, fig. 5	426
A. (Goniocheila) castorensis, Whitfield, 1877, pl. xii, fig. 1	427
Anchura, Conrad	428
A.? sublevis, M. & H., pl. xii, fig. 6	428
A. (Drepanocheilus) nebrascensis, E. & S., pl. xii, figs. 2, 3	429
Holostomata.	
Naticidæ.	
Lunatia, Gray	430
L. concinna, H. & M., pl. xii, fig. 13	430
Vanikora, Quoy and Gaimard	430
V. ambigua, M. & H., pl. xii, fig. 14	430–431
Amauropsis, Morch	431
A. paludinæformis, H. & M., pl. xii, fig. 16	431–432
Trochidæ.	
Margarita, Leach	432
M. nebrascensis, M. & H., pl. xii, fig. 15	432
Pulmonifera?	
Siphonariidæ?	
Anisomyon, M. & H	433
A. alveolus, M. & H., pl. xii, fig. 20	433–434
A. subovatus, M. & H., pl. xii, fig. 19	434–435
A. patelliformis, M. & H., pl. xii, figs. 17, 18	435
A. borealis, Morton, 1842, pl. xii, figs. 21–23	436
Tectibranchiata.	
Bullidæ.	
Haminea, Leach	437
H. subcylindrica, M. & H., pl. xii, fig. 24	437
Akera, O. F. Muller	437
A. glans-oryza, Whitfield, 1877, pl. xii, fig. 25	437–438
Prosopocephala.	
Solenoconchæ.	
Dentaliidæ.	
Dentalium, Linn.	438
D. gracile, H. & M., pl. xii, fig. 26	438–439

Page.

Cephalopoda.
Tetrabranchiata.
Nautilida.
Nautilus, Breynius.
N. dekayi var. *montanaensis*, Meek, pl. xvi, figs. 10, 11 439–440
Ammonitida.
Prionocyclus, Meek 440
P. wyomingensis, Meek, 1870, pl. xiv, figs. 1–3 440–441
Scaphitida.
Scaphites, Parkinson 441
S. nodosus, Owen, 1852, pl. xiii, fig. 12 441–443
S. nodosus var. *brevis*, Meek, pl. xiii, figs. 8, 9 443
S. nodosus var. *quadrangularis*, Meek, pl. xiii, figs. 10, 11 443–444
S. warreni, M. & H., pl. xiii, figs. 1–4 444–446
S. wyomingensis, M. & H., pl. xiii, figs. 5–7 446–447
Helicoceras, D'Orb. 447
H. stevensoni, Whitfield, 1877, pl. xiv, figs. 5–8 447–449
Heteroceras, D'Orb. 449
H. newtoni, Whitfield, 1877, pl. xv, figs. 1–4 449–451
H.? nebrascense, M. & H., pl. xv, fig. 6, and pl. xiv, fig. 9 451–452
Ancyloceras, D'Orb. 452
A. jenneyi, Whitfield, 1877, pl. xvi, figs. 7–9 452–454
A. tricostatus, Whitfield, 1877, pl. xv, figs. 7, 8 454–455
Ptychoceras, D'Orb. 455–457
P. meekanum, Whitfield, 1877, pl. xvi, figs. 1, 2 457–458
P. crassum, Whitfield, 1877, pl. xvi, figs. 3–5 459
Synopsis of species from the Black Hills, noticed in other works, not described in this report 460–464
List of fossils described in this report 465–468

5.

WHITFIELD, R. P. Brachiopoda and Lamellibranchiata of the Raritan Clays and Green sand Marls of New Jersey. < Monographs of the United States Geological Survey, Vol. ix, pp. i–xx and 1–264, pls. i–xxxv. Washington, 1885.

CONTENTS.

Page.

Letter of transmittal from Prof. George H. Cook ix
Sketch of the Geology of Cretaceous and Tertiary formations of New Jersey ix
Letter of transmittal from Prof. Robert P. Whitfield xv
Preliminary remarks xvii
Brachiopoda 3
Section I.—Brachiopoda of the Marl Beds 5
Lamellibranchiata 17
Section II.—Lamellibranchiata from the Raritan Clays 22
Section III.—Lamellibranchiata from the Lower Marl Beds 29
Section IV.—Lamellibranchiata from the Middle Marl Beds 194
Section V.—Lamellibranchiata from the base of the Upper Marls 205
Section VI.—Lamellibranchiata from the Eocene Marls 232
Section VII.—Unionidæ from the Camden Clays 243
Section VIII.—Classified list of the species 253

BRACHIOPODA.

Section I.—Brachiopoda from the several Marl Beds of the State.

Brachiopoda.
Terebratulida.
Terebratula, Llhwyd 6
T. harlani, Morton, pl. i, figs. 15–23 6–9
Terebratulina atlantica, Morton, pl. i, figs. 10–13 9–11
Terebratulina floridana, Morton 11–12
Terebratulina lachryma, Morton, pl. i, fig. 14 12
Terebratella, D'Orb. 12
T. plicata, Say, 1829, pl. i, figs. 5–9 12–14
T. vancouveri, Lyell & Forbes, 1845, pl. i, figs. 1–4 14–15

[redacted]

[redacted] pl. iv, figs. 1–8; and pl. v.....

[redacted] figs. 13–16.....

[redacted] pl. viii, figs. 10, 11.....

[redacted] pl. viii, figs. 17, 18.....

[redacted] pl. viii, fig. 7.....

[redacted] pl. vii, figs. 8–20.....

[redacted] Cobb, pl. viii, figs. 3–9....

Page.

Heteromyaria.
Mytilidæ.
Mytilus, Linn. ... 64
M. oblivius, n. s., Whitfield, 1885, pl. xvii, fig. 1 ... 64
Modiola, Lam. ... 64
M. julia, Lea, 1861, pl. xvii, figs. 6, 7? ... 64–65
M. burlingtonensis, n. s., Whitfield, 1885, pl. xvii, figs. 8, 9 ... 65–66
Lithodomus, Cuvier ... 66
L. affinis, Gabb, 1861, pl. xvii, figs. 2, 3 ... 66–67
L. ripleyana, Gabb, 1861, pl. xvii, figs. 4, 5 ... 67–68
Pteriidæ, Meek (=*Avicolidæ* of Authors) ... 68
Pteria, Scopoli ... 68
P. petrosa, Conrad, pl. xiv, fig. 10 ... 68–69
P. laripes, Morton, pl. xiv, fig. 9 ... 69–70
P. navicula, n. s., Whitfield, 1885, pl. xiv, fig. 8 ... 70–71
Meleagrinella, n. g., Whitfield, 1885 ... 71–72
M. abrupta, Conrad, pl. xiv, figs. 11–14 ... 72–73
Gervilliopsis, n. g., Whitfield, 1885 ... 73
G. ensiformis, Conrad, pl. xv, figs. 8–11, and pl. xvi, fig. 5 ... 73–74
G. minima, n. s., Whitfield, 1885, pl. xv, fig. 7 ... 74–75
Inoceramus, Sowerby ... 75
I. barabini, Morton? pl. xv, figs. 3, 5 ... 75–76
I. sagensis, Owen, pl. xiv, fig. 15, and pl. xv, figs. 1, 2 ... 76–78
I. sagensis var. *quadrans*, Whitfield, 1885, pl. xiv, fig. 16 ... 79
I. perovalis, Conrad, pl. xv, fig. 6 ... 80
I. pro-obliquus, n. s., Whitfield, 1885, pl. xiv, fig. 17 ... 80–81
Pinnidæ.
Pinna, Linn. ... 81
P. laqueata, Conrad, pl. xvi. figs. 1, 2 ... 81–82
Dimyaria.
Arcidæ.
Arca, Linn. ... 82
A. altirostris, Gabb, 1861, pl. xii, figs. 22, 23 ... 82–83
Nemodon, Conrad ... 83
N. eufaulensis, Gabb, pl. xii, figs. 3–5 ... 83–84
N. angulatum, Gabb, 1860, pl. xii, figs. 6, 7 ... 84–85
N. brevifrons, Conrad, pl. xii, figs. 1, 2 ... 85–86
Nemoarca, Conrad, 1870 ... 86
N. cretacea, Conrad, 1870, pl. xii, figs. 8–10 ... 86–87
Breviarca, Conrad ... 87
B. safordi, Gabb, pl. xii, figs. 11, 12 ... 87–88
Trigonarca, Conrad, 1862 ... 88
T. cuneiformis, Conrad, pl. xii, figs. 17, 18 ... 88–89
T. transversa, Gabb, 1861, pl. xii, figs. 13–16 ... 89–91
Cibota, Browne ... 91
C. rostellata, Morton, pl. xi, figs. 34–36 ... 91–92
C. uniopsis, Conrad, pl. xi, figs. 32, 33 ... 92–93
C. obesa, n. s., Whitfield, 1885, pl. xi, figs. 30, 31 ... 93–94
C. multiradiata, Gabb, 1860, pl. xi, figs. 21, 22 ... 94
Idonearca, Conrad, 1872 ... 95
I. tippana, Conrad, pl. xii, figs. 19–21 ... 95–96
I. antrosa, Morton, pl. xiii, figs. 6–11 ... 96–98
I. vulgaris, Morton, pl. xiii, figs. 1–5 ... 98–99
Axinea, Poli ... 99
A. mortoni, Conrad, pl. xi, figs. 23–25 ... 99–101
A. alta, n. s., Whitfield, 1885, pl. xi, figs. 26–29 ... 101
Nuculidæ.
Nucula, Lam ... 102
N. perorasa, Conrad, pl. xi, figs. 4–6 ... 102
N. monmouthensis, n. s., Whitfield, 1885, pl. xi, fig. 1 ... 102–103
N. slackiana, Gabb, pl. xi, figs. 2, 3 ... 103–104
N. perequalis, Conrad ... 104–105
Nuculana, Link ... 105
N. protexta, Gabb, pl. xi, fig. 10 ... 105–106
N. gabbana, n. s., Whitfield, 1885, pl. xi, figs. 11–13 ... 106–107
N. longifrons, Conrad, pl. xi, figs. 16, 17 ... 107–108

Page.

N. pinnaformis, Gabb, pl. xi, figs. 7, 8 108-109
N. compressifrons, Conrad, pl. xi, fig. 9 109
Perrisonota, Conrad 110
P. protexta, Conrad, pl. xi, figs. 14, 15 110
Nucularia, Conrad 111
N. papyria, Conrad, pl. xi, figs. 18-20 111-112
Trigonidæ.
Trigonia, Brug. 112
T. mortoni, n. s., Whitfield, 1885, pl. xiv, figs. 5, 6 112-113
T. eufaulensis, Gabb, pl. xiv, figs. 1-4 113-114
T. cerulea, n. s., Whitfield, 1885, pl. xiv, fig. 7 114-115
Siphonida.
Integripalliata.
Crassatellidæ.
Crassatella, Lam. 115-116
C. vadosa, Morton?, pl. xvii, figs. 12-15 116-117
C. cuneata, Gabb, pl. xvii, figs. 18-20 118-119
C. delawarensis, Gabb 119
C. monmouthensis, Gabb, pl. xvii, figs. 21, 22 119-120
C. prora, Conrad, pl. xvii, figs. 10, 11 120-121
C. subplana, Conrad, pl. xviii, figs. 14-16 121-122
C. transversa, Gabb, 1861, pl. xvii, figs. 16, 17 122-123
Scambula, Conrad, 1869 123
S. perplana, Conrad, pl. xviii, figs. 8-10 123-124
Astartidæ.
Gouldia, Ad 124
G. decemnaria, Conrad, pl. xviii, fig. 4 124-125
G. conradi, n. s., Whitfield, 1885, pl. xviii, figs. 1-3 125-126
G. declivis, Conrad, pl. xviii, fig. 11 126
G. paralis, Conrad, pl. xviii, figs. 12, 13 126-127
Veloricardia, Conrad, 1872 127
V. octolirata, Gabb 127-128
V. crenulirata, Lea, 1861, pl. xviii, figs. 5-7 128-129
Lucinidæ.
Lucina, Brug. 129
L. cretacea, Conrad, pl. xviii, figs. 23-25 129-130
L. smockana, n. s., Whitfield, 1885, pl. xviii, figs. 21, 22 130-131
Chamidæ.
Diceras, Lam. 131
D. dactyloides, n. s., Whitfield, 1885, pl. xviii, figs. 26, 27 131
Cardiidæ.
Cardium, Linn. 132
C. eufaulensis, Conrad, pl. xx, figs. 17-19 132
C. ripleyanum, Conrad, pl. xx, fig. 14 132-133
C. ripleyense, Conrad 133
Oriocardium, Conrad, 1870 133
Cardium (*Oriocardium*) *dumosum*, Conrad, pl. xx, figs. 9-13 133-135
Cardium (*Oriocardium*) *multiradiatum*, Gabb, pl. xxi, figs. 1-3 135-136
Protocardium, Beyrich 136
C. (*Protocardium*) *perelongatum*, n. s., Whitfield, 1885, pl. xx, figs. 20-22; pl. xxi, figs. 4, 5 136-138
Pachycardium, Conrad, 1870 138
P. burlingtonense, n. s., Whitfield, 1885, pl. xxi, figs. 6, 7 138
Fulvia, Grey 1847 139
F. tenuis, n. s., Whitfield, 1885, pl. xx, fig. 8 139
Fragum, Bolton 139
F. tenuistriatum n. s., Whitfield, 1885, pl. xx, figs. 15, 16 139-140
Leiopistha, Meek 140
L. protexta, Conrad, pl. xx, figs. 1-3 140-141
L. elegantula, Roemer 141-142
L. inflata, n. s., Whitfield, 1885, pl. xx, figs. 4, 5 142
Cymella, Meek 142
C. meeki, Whitfield, pl. xx, figs. 6, 7 142-143
Cyprinidæ.
Venilia, Stoliczka 144
V. conradi, Morton, pl. xix, figs. 8-10 144-145

Page.
V. decisa, Morton, pl. xix, figs. 15, 16 145–147
V. inflata, Conrad, pl. xix, figs. 4, 5 147–148
V. elevata, Conrad, pl. xix, figs. 6, 7 148–149
V. trigona, Gabb, 1861, pl. xix, figs. 11–14 149–150
V. subovalis, Conrad, pl. xix, figs. 1, 2 150–151
V. trapezoidea, Conrad, pl. xix, fig. 3 151–152
Sphaeriola, Stoliczka 152
S. umbonata, n. s., Whitfield, 1885, pl. xix, figs. 17, 18 152
Sinuopalliata.
Veneridæ.
Callista, Poli 153
C. delawarensis, Gabb, pl. xxii, figs. 8–10 153–154
Aphrodina, Conrad, 1868 154
A. tippana, Conrad, pl. xxii, figs. 6, 7 154–155
Cyprimeria, Conrad, 1864 156
C. depressa, Conrad, pl. xxii, figs. 11–13 156–157
C. densata, Conrad, pl. xxii, figs. 19–21 157–158
C. excavata, Morton, pl. xxii, figs. 16, 17 159–160
C. heilprini, n. s., Whitfield, 1885, pl. xxii, figs. 14, 15 160
C. spissa, Conrad, pl. xxii, fig. 18 160–161
Dosinia, Scopoli 161
D. gabbi, n. s., Whitfield, 1885, pl. xxii, figs. 4, 5 161–162
D.? erecta, n. s., Whitfield, 1885, pl. xviii, figs. 17–20 162–163
Tenea, Conrad, 1871 163
T. pinquis, Conrad, pl. xxii, figs. 1–3 163–164
Tellinidæ.
Tellimera, Conrad, 1871 164
T. eborea, Conrad, pl. xxiii, figs. 12, 13 164–165
Linearia, Conrad, 1871 165
L. metastriata, Conrad, pl. xxiii, figs. 6–8 165–166
L. contracta, n. s., Whitfield, 1885, pl. xxiii, fig. 5 167
Æora, Conrad, 1871 167
Æ. cretacea, Conrad, pl. xxiii, figs. 16, 17 167–168
Aenona, Conrad, 1871 168
Æ. eufaulensis, Conrad, pl. xxiii, figs. 2, 3 168–169
Æ. papyria, Conrad, pl. xxiii, fig. 4 168–170
Corimya, Agassiz 170
C. tennis, n. s., Whitfield, 1885, pl. xxiii, figs. 9–11 170–171
Donacinidæ.
Donax, Linn. 171
D. fordii, Conrad, pl. xxiii, fig. 1 171–172
Mactridæ.
Veleda, Conrad, 1871 172
V. lintea, Conrad, pl. xxiii, figs. 18–21 172–173
V. tellinoides, n. s., Whitfield, 1885, pl. xxiii, fig. 23 173–174
V. transversa, n. s., Whitfield, 1885, pl. xxiii, fig. 22 174
Anatinidæ.
Pholadomya, Sowerby 175
P. occidentalis, Morton, pl. xxiv, figs. 1–3 175–176
P. roemeri, n. s., Whitfield, 1885, pl. xxiv, fig. 4 176–177
Periplomya, Conrad 177
P. elliptica, Gabb, 1861, pl. xxiii, figs. 14, 15 177–178
Cercomya, Agassiz 178
C. peculiaris, Conrad, pl. xxiii, figs. 24, 25 178
Corbulidæ.
Corbula, Bruguière 178
C. crassiplica, Gabb, pl. xxiii, fig. 30 178–179
C. foulkei, Lea, 1861, pl. xxiii, figs. 27–29 180
C. subcompressa, Gabb, pl. xxiii, fig. 26 180–181
Saxicavidæ.
Panopea, Ménard 181
P. decisa, Conrad, pl. xxiv, figs. 5–8 181–182
Solenidæ.
Solyma, Conrad, 1871 182
S. lineolata, Conrad, pl. xxv, figs. 11–13 182–183

Page.
Leptosolen, Conrad, pl. xxv, figs. 1–3 183–184
Legumen, Conrad, 1858 184
L. planulatum, Conrad, xxv, figs. 3–4 184–185
L. appressum, Conrad, pl. xxv, figs. 6–8 185–186
Siliqua, Muhlfeld 186
S. cretacea, Gabb, pl. xxv, figs. 9, 10 186–187
Pholadidæ.
Pholas, Linn. 187
P. cithara, Morton, pl. xxv, 14–16 187–188
P.? lata, n. s., Whitfield, 1885, pl. xxv, fig. 17 188–190
Martesia, Leach 190
M. (Pholas) cretacea, Gabb, pl. xxv, figs. 20–23 190
Teredidæ.
Teredo, Linn 191
T. irregularis, Gabb, pl. xxv, figs. 18, 19 191–192
Gastrochænidæ.
Clavagella, Lam 192
C. armata, Morton, pl. xxv, fig. 24 192–193

Section iv.—Lamellibranchiata from the Middle Marl Beds.

Ostreidæ.
Gryphæa, Lam. 194
G. vesicularis, Lam., pl. xxvi, figs. 9, 10 194
G. bryani, var. *precedens*, n. var., Whitfield, 1885, pl. xxvi, figs. 7–8 194–195
Gryphæostrea, Conrad 195
G. vomer, Morton, pl. xxvi, figs. 11–12 195–196
Mytilidæ.
Modiola, Lam. 197
M. ovata, Gabb, pl. xxvi, figs. 13–14 197
M. (Lithodomus?) inflata, n. s., Whitfield, 1885, pl. xxvi, figs. 1–2 197–198
Pteriidæ, Meek.
Pinna, Linn. 198
P. rostriformis, Morton, pl. xvi, figs. 3–4 198
Arcidæ.
Idonearca, Conrad 199
I. medians, n. s., Whitfield, 1885, pl. xxvi, figs. 5–6 199
I. compressirostra, n. s., Whitfield, 1885, pl. xxvi, figs. 15–16 199–200
Isocardiidæ.
Isocardia, Lamarck 200
I. conradi, Gabb, pl. xxvi, figs. 3–4 200–201
Teredidæ.
Teredo, Linnæus 201
T. tibialis, Morton, pl. xxvi, figs. 19–22 201–203
Gastrochænidæ.
Gastrochæna, Spengl 203
G. americana, Gabb, pl. xxvi, figs. 17–18 203–204

Section V.—Lamellibranchiata from the lower layers of the Upper Marl Beds of New Jersey.

Ostreidæ.
Ostrea, Linnæus 205
O. glandiformis, n. s., Whitfield, 1885, pl. xxvii, figs. 1–5 205–206
Gryphæa, Sow 206
G. bryani, Gabb, 1876, pl. xxvii, figs. 6–9 206–207
Mytilidæ.
Modiola, Lam. 207
M. johnsoni, n. s., Whitfield, 1885, pl. xxviii, figs. 8, 9 207
Arcidæ.
Arca, Linn 208
A. quindecemradiata, Gabb, 1860, pl. xxvii, figs. 10–13 208
Astartidæ.
Cardita, Brug. 209
C. intermedia, n. s., Whitfield, 1885, pl. xxviii, figs. 14, 15 209
Crassatella, Lamarck 209
C. conradi, n. s., Whitfield, 1885, pl. xxviii, figs. 1–5 209–210
C. delawarensis, Gabb, pl. xxvii, figs. 14, 15 210–211

Page.
C. litteralis, Conrad, pl. xxviii, figs. 6, 7. 212-213
C. rhombea, n. s., Whitfield, 1885, pl. xxvii, figs. 16-19 213-214
Cardiidæ.
Oriocardium, Conrad 214
C. nucleolus, n. s., Whitfield, 1885, pl. xxviii, figs. 10, 11 214-215
Cyprinidæ.
Veniella, Stoliczka 215
V. rhomboidea, Conrad, pl. xxviii, figs. 12, 13 215-216
Petricolidæ.
Petricola, Lam. 216
P. nova-egyptica, n. s., Whitfield, 1885, pl. xxviii, fig. 22 216-217
Mactridæ.
Veleda, Conrad, 1871 217
V. nasuta, n. s., Whitfield, 1885, pl. xxviii, fig. 23 217
Veneridæ.
Caryatis, Roemer 218
C. ? veta, n. s., Whitfield, 1885, pl. xxviii, figs. 16-19 218-219
Saxicavidæ.
Panopea, Ménard 219
P. elliptica, n. s., Whitfield, 1885, pl. xxviii, figs. 24, 25 219-220
Anatinidæ.
Periplomya, Conrad 220
P. truncata, n. s., Whitfield, 1885, pl. xxviii, figs. 20, 21 220-221

Section VI.—Lamellibranchiata from the Eocene marls of New Jersey.

Ostreidæ.
Ostrea, Linnæus 222
O. glauconoides, n. s., Whitfield, 1885, pl. xxix, fig. 2 222-223
O. (Alectrionia?) linguafelis, n. s., Whitfield, 1885, pl. xxix, fig. 1 223
Gryphæa, Lam. .....
G. vesicularis, Lam., pl. xxix, figs. 7, 8 224
Pectenidæ.
Pecten, Klein 224
P. kneiskerni, Conrad, pl. xxix, figs. 3-5 224-226
P. rigbyi, n. s., Whitfield, 1885, pl. xxix, fig. 6 226
Avicula annosa, Conrad, pl. xxix, fig. 9 226-227
Nuculidæ.
Nucula, Lam. 227
N. circe, n. s., Whitfield, 1885, pl. xxix, fig. 12 227-228
Nuculana, Mörch 228
N. albaria, Conrad, pl. xxix, figs. 15, 16 228-229
Nucularia, Conrad 229
N. secunda, n. s., Whitfield, 1885, pl. xxix, figs. 13, 14 229-230
Axinea, Poli 230
A. conradi, n. s., Whitfield, 1885, pl. xxix, figs. 10, 11 230
Astartidæ.
Astarte, Sowerby 231
A. castanella, n. s., Whitfield, 1885, pl. xxx, figs. 1, 2 231
A. planimarginata, n. s., Whitfield, 1885, pl. xxx, figs. 3, 4 232
Cardita, Brug. 232
C. perantigua, Conrad, pl. xxx, figs. 8-10 232-233
C. brittoni, n. s., Whitfield, 1885, pl. xxx, figs. 11, 12 233-234
Crassatella, Lam. 234
C. alta, Conrad, pl. xxix, fig. 17 234-235
C. obliquata, n. s., Whitfield, 1885, pl. xxix, fig. 18, and pl. 30, figs. 13, 14 235-236
Cardiidæ.
Protocardium, Beyr. 236
P. curtum, Conrad, 1870, pl. xxx, figs. 5-7 236-237
Veneridæ.
Caryatis, Roemer 237
C. ovalis, n. s., Whitfield, 1885, pl. xxx, figs. 15, 16 237-238
Mactridæ.
Veleda, Conrad, 1871 238
V. equilatera, n. s., Whitfield, 1885, pl. xxx, fig. 17 238-239

Page.
Corbulidæ.
Corbula, Brug. 239
C. (Nexæa) nasutoides, n. s., Whitfield, 1885, pl. xxx, figs. 18, 19 239-240
Nexæa, Grey 240
N. aquiscalvis, n. s., Whitfield, 1885, pl. xxx, figs. 20, 21 240-241
Pholadidæ.
Parapholas, Conrad, 1848 241
P. knickerni, n. s., Whitfield, 1885, pl. xxx, figs. 22-24 241-242
Teredidæ.
Teredo, Linn. 242
T. emaceratæ, n. s., Whitfield, 1885, pl. xxx, fig. 25 242
Section VII.—Unionidæ, from the clays at Fish House, Camden County.
Unionidæ.
Unio, Retzius 244
U. nasutoides, Lea, 1868, pl. xxxiv, figs. 4, 5 244-245
U. radiatoides, Lea, 1868, pl. xxxiv, figs. 1-3 245-246
U. subrotundoides, Lea, 1868, pl. xxxii, fig. 5 246-247
U. carioscoides, Lea, 1868, pl. xxxii, fig. 3 247
U. humeroscoides, Lea, 1868, pl. xxxi, fig. 4 248
U. roanokoides, Lea, 1868, pl. xxxi, fig. 3, and pl. xxxiii, figs. 1, 2, and pl. xxxiv, fig. 7. 248-249
U. ligamentinoides, Lea, 1868, pl. xxxi, fig. 1, and pl. xxxii, fig. 4, and pl. xxxiv, fig. 8 249
U. alatoides, Lea, 1868, pl. xxxiii, figs. 3, 4, and pl. xxxiv, fig. 6 249-250
U. præcanodontoides, n. s., Whitfield, 1885, pl. xxxi, fig. 2 250
U. rectoides, n. s., Whitfield, 1885, pl. xxxii, figs. 1, 2 250-251
Anodonta, Cuvier 251
A. grandoides, Lea, 1868, pl. xxxv, figs. 2, 3 251-252
A. corpulentoides, Lea, 1868, pl. xxxv, fig. 1 252
Section VIII. Appendix.
Classified list of the species described in this volume 253-264

6.

WHITFIELD, R. P., *and* HALL, JAMES. (See Hall, James, and Whitfield, R. P.)
WHITFIELD, R. P., *and* WHITE, C. A. (See White, C. A., and Whitfield, R. P.)

SUPPLEMENT.

THE WRITINGS OF J. W. BAILEY.

LEY, J. W. Notes concerning the minerals and fossils collected by Lieutenant J. W. Abert, while engaged in the geographical examination of New Mexico. <Rep. of Lieut. J. W. Abert of his Examination of New Mexico in the years 1846–'47. Ex. Doc. No. 41, pp. 547–548, and 3 plates. Washington [1849].

Plate [I] faces p. 522, and contains fossil leaves from the coal beds of the Raton.

Plate [II] faces p. 546, and contains sharks' teeth and some *Gasteropods* from Poblasen and an [*Athyris*] from Tuerto.

Plate [III] faces p. 547, and contains an *Inoceramus* [*problematicus*] and a fossil leaf from the coal bed at Raton.

THE WRITINGS OF I. N. NICOLLET.

OLLET, I. N. List of Fossils belonging to the several formations alluded to in the Report; arranged according to localities. <Rep. intended to illustrate a Map of the Hydrographical basin of the Upper Mississippi river made by I. N. Nicollet. 26th Congress, 2d session, Senate Ex. Doc. No. 237. Appendix C, pp. 167–170. Washington, 1843.

	Page.
Atrypa lingulata, n. s., Nicollet, 1843	167
Ostrea congesta, Conrad	169

A large number of fossils are mentioned by their generic names and said to be new species, but no specific name is given and they are not described.

THE WRITINGS OF HIRAM A. PROUT.

1.

UT, H. A. Description of New Species of Bryozoa from Texas and New Mexico, collected by Dr. George G. Shumard, Geologist of the U. S. Expedition for Boring Artesian Wells along the 32d Parallel, under the direction of Capt. John Pope, U. S. Corps Top. Eng. <Trans. St. Louis Acad. Sci., vol. i, pp. 228–235. 1858. St. Louis, 1856–'60.

	Page.
*Fenestella tritubercula*ta, n. s., Prout, 1858	228–229
Fenestella popeana, n. s., Prout, 1858	229–230
Fenestella corticata, n. s., Prout, 1858	230
Fenestella intermedia, n. s., Prout, 1858	231
Fenestella variabilis, n. s., Prout, 1858	231–232
Fenestella shumardii, n. s., Prout, 1858	232
Fenestella norwoodiana, n. s., Prout, 1858	232
Fenestella subretiformis, n. s., Prout, 1858	233–234
Eschara ? concentrica, n. s., Prout, 1858	234
Eschara ? tuberculata, n. s., Prout, 1858	234–235

2.

PROUT, H. A. Second Series of Descriptions of Bryozoa from the Paleozoic Rocks of the Western States and Territories. <Trans. St. Louis Acad. Sci., vol. i, pp. 266–273, pl. xvi, figs. 2 *a*, *b*. 1858. St. Louis, 1856–'60.

PERMIAN SPECIES.

	Page.
Polypora mexicana, n. s., Prout, 1858, pl. xvi, figs. 2 *a*, *b*	270–271

THE WRITINGS OF BENJAMIN F. SHUMARD.

SHUMARD, B. F. Paleontology. <Rep. of a geological exploration from Fort Leavenworth to Bryan's Pass, made in connection with the survey of a road from Fort Riley to Bridger's Pass, under command of Lieutenant F. T. Bryan, topographical engineer, 1856, by H. Engelmann, geologist and mining engineer. <Rep. of the Secretary of War. Message from the President of the U. S. to the 35th Congress, 1st session, Ex. Doc. No. 2, vol. ii, pp. 517–520. Washington, 1857.

Gives two lists and notes of fossils, and describes one new species *Mytilus engelmanni*.

FOSSILS OF THE COAL MEASURES.

	Page.
Brachiopoda.	
Productus splendens, Norwood & Pratten	518
Productus villiersi, D'Orbigny	518
Productus nebrascensis, Owen, D. D	518
Productus æquicostatus, Shumard	518
Productus semireticulatus, Mart., sp	518
Chonetes smithii, Norwood & Pratten	518
Terebratula ? subtilita, Hall	518
Spirifer plano-convexa, Shumard	518
Spirifer meusebachanus, Roemer, F	518–519
Spirifer kentuckensis, Shumard	519
Rhynconella —— ?	519
Atrypa —— ?	519
Orthisina umbraculum ? Buch, sp	519
Acephala.	
Myalina subquadrata, Shumard	519
Mytilus engelmanni, n. s., Shumard, 1857	519
Arca —— ?	519
Pecten occidentalis, Shumard	519
Avicula —— ?	519

FOSSILS OF THE CRETACEOUS FORMATION.

Ammonites peracutus ? H. & M	520
Scaphites mandenensis, Morton, sp	520
Scaphites nicolleti, Morton, sp	520
Rostellaria nebrascensis, Evans & Shumard	520
Ostrea congesta, Conrad	520
Inoceramus cripsii, Mantell	520
Inoceramus barabini, Morton	520
Inoceramus sagensis ? Owen, D. D	520
Inoceramus fragilis, H. & M	520
Inoceramus ten[u]ilineatus, Hall & Meek	520
Arca shumardi, M. & H	520
Vertebral scales and fin bones of fishes	520

INDEX OF GENERA AND SPECIES.

[The page numbers in heavy type indicate references to the original descriptions.]

A. Page.

Abra? formosa ... 48
Acambona ... **119**
pinna ... 129
Acanthocardium ... 99
Acanthocladia americana ... 19, 257
Acanthotelson ... **36**, 46, 53, 61, 179
eveni ... **53**, 61, 179
inæqualis ... **36**, 46
stimpsoni ... **36**, 46, 61, 179
Acanthotelsonidæ ... 36
Acar ... 98
Acella ... 106, 141, 161
haldemani ... **141**, 161
Acephala ... 225, 232, 255, 258, 274
Acervularia ... 108, 150, 155, 163, 223
adjunctiva ... **150**, 163
davidsoni ... 155
pentagona ... 108, 192
Acidaspis ... 57, 79, 186
ceralepta ... 79
cincinnatiensis ... 79
crocotus ... 79
humata ... 57
parvula ... **186**
Acila ... 98
Aclis ... 74, 86, 152
robusta ... 86
? stevensoni ... **152**
swalloviana ... 74
Acmæa occidentalis ... 102
papillata ... 102
parva ... 102
Acmæidæ ... 102
Acoeli ... 35
Acrochordiocras ... **110, 239**
hyatti ... **110, 239**
Acroloxus ... 106, 161
minutus ... 106, 161, 169
Acrothele ... 189, 198
? dichotoma ... **189**
matthewi ... 198
Acrotreta ... 126, 129, 189
gemma ... 189
pyxidicula ... **126**, 129
subsidua ... **126**, 129
Actæon ... 94, 101, 143
attenuatus ... 101
concinnus ... **13**
ellipticus ... 50
impressa ... **220**

Page.

Actæon intercalaris ... **94**
melanellus ... 221
pygmæus ... 221
(Solidula) attenuata ... **18**
striatus ... 221
subellipticus ... **14**, 101
woosteri ... **143**
Actæonella ... 29, 210
syriaca ... **210**
Actæonema striata ... 220
sulcata ... 220
Actæonidæ ... 101
Actæonina ... 29, 86, 143
biplicata ... 48
minuta ... 86
naticoides ... 48
prosocheila ... **143**
Actæoninæ ... 29
Actinaria ... 96, 142, 165
Actinoceramus ... 47, 97
Actinoceras ... 27
Actinocrinidæ ... 53, 81
Actinocrinites ... 81, 87
delicatus ... 81
longus ... 81
penicillus ... 81
sculptilis ... 87
sculptus ... 81
Actinocrinus ... 23, 26, 37, 38, 41, 42, 59, 118, 127, 130, 149, 165
(Alloprosallocrinus) euconus . **38**
(Amphoracrinus?) concavus .. **26**
subturbinatus ... **23**
araneolus ... **23**
asteriscus ... **23**
(Batocrinus) asteriscus ... 42
dodecadactylus .. 42
pistilliformis ... 41
pistillus ... 59
calyculus var. pardinensis ... 40
concinnus ... 42
delicatus ... 87
dodecadactylus ... **26**
evansii ... **249**
nashvillæ var. subtractus ... 118
pistillus ... **37**
(Pradocrinus?) amplus ... **26**
pyriformis var. rudis ... 26
quadrispinus ... **118**

Page.

Actinocrinus (Saccocrinus?) amplus 59
scitulus 23, 42
sillimani 26, 42
speciosus 23
(Sphærocrinus) concavus 37
unicornicus 249, 251
validus 23
viaticus 127, 130
wachsmuthi 118, 149, 165
Actinopteria 194
boydi 194
Actinosoa 129, 130, 131, 136, 138, 144, 147, 158, 163, 192
Adelopthalmus mazonensis? 58
Admete (Admetopsis) gregaria 134
? gregaria 76
? subfusiformis 76
? rhomboides 76
Admetidæ 135
Admetopsis 134, 144
rhomboides 144
subfusiformis 144
Ænona 269
cufaulensis 269
papyria 269
Æora 269
cretacea 269
Aganides 104
Agaricocrinus 26, 82, 83, 154
gracilis 26
nodosus 82
springeri 154
whitfieldi 83
Agaronia punctulifera 222
Agassizocrinus 85, 87, 249, 251
carbonaria 85
chesterensis 85
conicus 85, 249, 251
dactyliformis 255
gibbosus 85
pentagonus 85
Agelacrinites 54, 78, 83
(Lepidodiscus) cincinnatiensis 78
squamosus 54, 83
pilcus 78
vorticellata 78
Agnostus 126, 129, 189, 198, 234
acadicus 198
bidens 189
communis 189, 234
interstricta 126, 129
neon 189, 234
prolongus 189, 234
richmondensis 189
seclusus 189
tumidosus 234
Agraulos 31, 190, 199
Agraulos —— ? 31
Agraulos? globosus 190
oweni 31
quadrangularis 199
Akera 261, 264
glans-oryza 261, 264
Alaba 102

Page.

Alasmodonta 98
Alcyonaria 98
Alectryonia 97, 126, 151, 158
Alethopteris whitneyi 246
Alipes 102
Alloposallocrinus 36, 54
Allorisma 33, 45, 61, 78, 86, 88, 90, 123, 128, 147, 160, 162, 165, 178, 245
? altirostrata 19, 20
andax 223
capax 245
(Cercomyopsis) pleuropistha 89
(Chænomya) hybrida 61
? cooperi 19, 20
costata 86, 89
elegans 51, 52
geinitzii 88
? gilberti 147, 162
? leavenworthensis 19, 20
marionensis 128, 165
nucula arata 239
(Sedgwickia) geinitzii 73
grandes 73
pleuropistha 66
reflexa 73
subelegans 73
subcuneata 19, 20, 32, 73, 142, 178
var 132
terminalis 239
ventricosa 67, 88
winchelli 67, 89
Alveolites 62, 102, 103
goldfussi 103
multilamella 106
rockfordensis 102
vallorum 62
Amauropsis 162, 204
paludinæformis 162, 204
Ambocœlia 31, 119
(Spirifer?) minuta 119
Ambonicardia 206
cookii 206
Ambonychia 55, 56, 79
acutirostris 56
carinata 222
costata 79
intermedia 55
(Megaptera) alata 68, 79
casei 41, 79, 143
Ammonites 28, 35, 93, 104, 135, 208, 209, 210, 219, 227, 245, 253, 255, 263
acuto-carinatus 255
belknapii 243
cheyennensis 250
complexus 14, 16
var. suciaensis 27, 8
cordiformis 19, 35, 39
var. distans 28
galpini 256
geniculatus 219
gibbonianus 26
graysonensis 13
halli 15
henryi 19, 8
lævianus 135

Page.

amaonites lenticularis 250
leonensis 219
libanensis 210
marciana 255
moreauensis 250
mullananus 29
†† mullananus 107
nebrascensis 250
newberryanus 17, 93
novi-mexicana 243
opalus 250
peraultus 274
percarinatus 14, 245
peruvianus 243
pickeringi 227
placenta, var. intercalaris 21
dekayi, var. intercalaris 135
pleuriscepta 219
safedensis 209
(Scaphites†) ramosus 17
serrato-carinatus 66
shumardi 243
swallovii 150
syriacus 208
texanus 219
vancouverensis 27
vermilionensis 21
vespertinus 255
ammonitida 35, 104, 135, 263, 265
amphoxus 41
amylita 107
aphioscelis 56
neglecta 56
aphidiscus armacus 229
aphion 191
nevadensis 191
aphistegina 120
aphera libyca 229
apheracrinus 42, 54, 82
divergens 54, 82
† spinobranchiata 82
subturbinatus 42
aplexus 121, 136, 155, 163, 223
coralloides † 243
fragilis 121
yandelli 156
saphrentiformis 136, 160
apullaria 197
powelli 180, 188, 197
apullina alveata 221
aucina 266
conradi 266
simplicum 266
aucula 35
aurarium 35
propatulum 49
aulera † canalis 50
† congesta 50
incile 50
microdonta 50
protracta 50
trigintinaria 50
trilineata 50
authracosaura australis 227

Page.

Anatina claibornensis 220
Anatinidæ 30, 32, 34, 100, 109, 111, 134, 261, 262, 264, 271
Anchura 94, 102, 111, 127, 134, 137, 143, 264
biangulata 48
(Drepanoch[æ]lina) americana 48, 102
decemlirata 48
mudgeana 143
nebrascensis 48, 102, 264
prolabiata 143
rostrata 48
ruida 143
†† fusiformis 111, 134
haydeni 143
newberryi 94
nuptialis 125, 127
parva 48, 102
prolabiata 137
ruida 137
† sublævis 48, 102, 264
Ancillaria elongata 222
Ancillopsis altile 222
Ancylidæ 106
Ancyloceras 104, 209, 261, 265
annulatum 159
† cheyenensis 15
(Hamites) uncus 19
jenneyi 261, 265
† nebrascensis 15
nicolletii 14
safedensis 209
tricostatus 261, 265
† uncum 104
Ancyloceratidæ 104
Ancylus 112
undulatus 65, 112, 166, 170
Angulus 100
Animalia 129
Anisomyon 20, 102, 112, 134, 143, 264
alveolus 21, 102, 264
borealis 21, 102, 134, 264
centrale 70, 134, 143
inæquicostatus 48
patelliformis 20, 21, 102, 264
sexsulcatus 21, 102, 112
shumardi 102
subovatus 21, 102, 264
Anisopoda 46
Anisorhynchus 101
Anisothyris 101
Anisus 34, 106, 108
Annularia 149
longifolia 149
Annulata 35
Anodonta 140, 160, 272
† angustata 167
† cattskillensis 167
corpulentoides 272
decurtata 170
grandoides 272
parallela 146, 160, 168
propatoria 139, 160, 168
Anodontopsis 79, 194
amygdalæformis 194

Page.

Anodontopsis ? milleri 66, 79
(Modiolopsis ?) unionoides... 79
unionoides. 66
Anolax gigantea 222
plicata 222
Anomalocardia trigintinaria.... 50
Anomalocrinus....37, 55, 77
incurvus 77
Anomalocystites 77
(Atelecocystites) balanoides....69, 77
Anomia 93, 95, 97, 158, 160, 211, 213, 219, 266
argentaria 266
concentrica 22, 95
gryphorhynchus 71, 160, 168
micronema 88, 160, 168
nitida 93
? obliqua....21, 97
(Placunopsis ?) gryphorhyncus 77
propatoris....158, 167
retiformis 111
subcostata 211, 213, 219
subtrigonalis 21, 97
tellinoides 266
anomiidæ.... ....97, 111, 266
Anomocare.... 190
? parvum 190
Anomolacardia rhomboidella.... 220
Anomphalus....40, 87
rotulus 40, 87
Anthophyllum cuneiforme.... 220
expansum 247
Anthracerpes....37, 46, 53
typus....37, 46
Anthracoptera 61, 165
? ? fragilis....41, 61
polita.... 165
Anthracopupa ohioensis 167
Anthrapalæmon .... .37, 46, 61, 179
gracilis....37, 46, 61, 179
Aphrodina 100, 269
tippana.... 269
Aploceras 27
Aporrhaidæ 102, 111, 134, 264
Aporrhais....102, 264
biangulata 102
decemlirata.... 48
(Goniocheila) castorensis....261, 264
meeki 261, 264
newberryi 264
parva 21, 48
sublævis....21, 48
Aptycha 29
Arachnida 61
Arachnophyllum.... 223
Arca.....92, 137, 207, 208, 209, 211, 213, 215, 216, 217, 218, 267, 270
——?....206, 274
acclivis.... 207
altirostris 267
bhamdunensis 209
brevifrons 207
canalis 50, 215, 216
carbonaria 20
? coalvillensis 137

Page.

Arca congesta 50, 215, 216
(Cucullæa) cordata 15
equilateralis 17
inornata....18, 180
shumardi 15
cuneus 209
declivis.... 207
devincta.... 206
equilateralis.... 92
fabiformis 206
incile.... 50
indurata 207
longa 209
microdonta....50, 211, 213
obispoana.... 217
orientalis 207
parallela.... 70
protracta.... 50
quindecemradiata 270
rhomboidella 220
shumardi.... 274
striata.... 51
subelongata 218
subrotundata.... 207
sulcatina 256
syriaca 207
trilineata.... ....50, 215, 216
vancouverensis.... 17
Arcadæ 28
Arcestes....110, 146, 162, 230
? ——?....146, 162
? cirratus....140, 162, 230
gabbi....110, 230
? perplanus....110, 230
Arcestidæ 110, 230
Archæcocaris.... 90
vermiformis.... 89
Archæocidaridæ 43
Archæocidaris 23, 44, 72, 127, 131, 136, 150, 151, 163, 196, 245
——? 19, 87
cratis....136, 162
dininnii 150, 162
gracilis 245
longispinus 245
mucronata....23, 44
ornatus....131, 245
triplex.... 151
triserrata.... 72
trudifer....127, 131
Archæocaris vermiformis 62
Archimedes....147, 154, 248
laxa.... 154
Archimedipora.... 94
——?.... 94
archimedes.... 255
Architectonica abotti 48
henrici.... 221
ornata.... 221
plana 221
pseudogranulata 221
Arcidæ.... 83, 96, 111, 134, 262, 263, 267, 270
Arcinæ 28
Arcopagella 70, 180
? macrodonta 180

Page.
Arcopagella mactroides 70, 100
Arcopagia 215, 216, 217, 218
medialis 215, 216
texana 218
unda 217
Arenicolites? 261
Arethusiana 190
americana 190
Arionellus 28, 186, 259
(Crepicephalus) oweni 28
pustulatus 186
tripunctatus 259
Arrhoges 102
Articulata 31, 35, 46, 55, 56, 58, 59, 74, 79, 80, 81, 84, 91, 105, 108, 109, 135, 136, 138, 144, 153, 159, 165, 260, 261
Asaphiscus 129
wheeleri 129
Asaphus 79, 91, 185, 186, 191, 248
barrandi 232
caribouensis 191
? curiosa 191
emoryi 233
homalonotoides 186
(Isotelus) iowensis 250
megistos 79
vigilans 65, 91
(Megalaspis?) goniocercus 76
romingeri 185
wisconsensis 185
Asiphonida 266
Astarte 30, 34, 164, 207, 208, 209, 218, 236, 262, 263, 266, 271
arctata 207
? arenosa 236
castanella 271
engonata 207
evansi 263
? fragilis 22, 34, 262
gemma 224, 225
gibbosa 51
gregaria 15
inornata 22, 34
lintea 208
lucinoides 209
minutissima 220
mortonensis 51
mucronata 208
nebrascensis 51
orientalis 207
packardi 164, 180
parva 220
pervetus 207
planimarginata 271
subcordata 209
sublineolata 208
syriaca 207
texana 218
undulosa 208
vallismerianus 51
ventricosa 30
veta 266
washitensis 255
Astartella 90, 144, 165
——? 90
Page.
Astartella gurleyi 144, 165
newberryi 90
varica 90
astartidæ 266, 268, 270, 271
Astartila 224, 225
? corpulenta 225
cyclas 224, 225
cyprina 224, 225
cytherea 224, 225
intrepida 224, 225
polita 224, 225
transversa 224, 225
Astereidæ 26
Asterias 260, 261
dubium 260, 261
Asteridæ 24
Asteroidea 40, 44, 60, 61, 78, 260, 261
Astræospongia 58
hamiltonensis 41, 58
Astrea fungiformis 247
? gigas 247
mamillaris 247
Astrodapsis 215, 217
antiselli 216, 217
Astylospongia 56, 192
? carbonaria 41
? ? christiani 56
præmorsa 91
Athyris 24, 43, 72, 85, 89, 92, 94, 109, 148, 178, 193, 196, 235, 245, 273
angelica 193
claytoni 235
crassicardinalis 116
hirsuta 196
lamellosa 89
parvirostra 24
persinuata 109
planosulcata 43, 235
roissyi 109
subquadrata? 235
subtilita 52, 72, 85, 92, 94, 109, 178, 245, 246
vittata 148
Atlantidæ 121
Atrypa 58, 62, 94, 108, 148, 193, 247, 248
——? 274
aspera 58, 62, 94
comis 250
desquamata 193
limitaris? 247
lingulata 273
orbicularis 248
prisca 247
reticularis 58, 62, 94, 108, 148, 193
Aturia angustatus 50
orbiculata 49
vanuxemi 222
Aucella 35, 176
concentrica var 176
erringtoni 35
var. linguiformis 35
hausmanni 51, 52
Aulacomya 98
Aulophyllum 62
? richardsoni 62
Aulopora serpens 192, 243

Page.

Aulopora tubæformis 248
Aulosteges 121
guadalupensis 256
spondyliformis 120, 121
Auriculidæ 112
Australella rigida 227
Avalana subglobosa 14, 29, 102
Avicula 24, 73, 86, 136, 208, 262
——? 224, 274
abrupta 47
annosa 271
convexo-plano 47
cretacea 47
curta 49
? custa 232
? fibrosa 15
haydeni 13, 47
iridescens 47
laripes 47
linguiformis 47
longa 73, 86
(Monotis) tenuicostata 18
morganensis 86
multangula 50
munsteri 49
nebrascana 47, 255
oblonga 24
(Oxytoma) gastrodes 76
mucronata 262
parkensis 136
pedernalis 47
petrosa 47
pinnæformis 51
planisulca 47
(Pseudoptera) propleura 76
rhytophora 76
samariensis 208
speluncaria 51
subgibbosa 21, 47
? sulcata 73
triangularis 47
volgensis ? 226
Aviculidæ 29, 32, 262, 263, 267
Aviculinæ 29, 32
Aviculopecten 24, 32, 43, 45, 61, 73, 80, 89, 90, 94, 110, 116, 119, 127, 132, 146, 162, 164, 178, 196, 235, 236
——? 32
affinis 196
altus 146, 162
amplus 24, 32, 43
burlingtonensis 24, 43
carbonarius 87
carboniferus 73, 178
catactus 110
coreyana 197, 132
coxanus 24, 45, 73
crenistriatus 66, 89
cuneo-cardinalis 236
(Eumicrotis ?) augustensis .. 236
eurekensis 196
fimbriatus 41
grandocostus 119
haguei 196
hawni 51

Page.

Aviculopecten idahoensis 144, 162
indianensis 41, 61
interlineatus 24, 45, 122, 178
koninckii 24, 45
limaformis 116
macoyi 62, 122
neglectus 72, 86, 87
nodocostatus 116
oblongus 43
occidaneus 110
occidentalis 45, 72, 122, 178
owenl 24, 43
paralis 89
parvulus 226
pealei 146
? pealei 162
pellucidus 24, 45
peroccidens 196
pintoensis 196
(Pseudomonotis) idahoensis. 71
randolphensis 41
sanduskyensis 67
spinuliferus 64
(Streblopteria ?) hertzeri .. 66, 89
superstrictus 164
utahensis 24, 119
weberensis 235
whitei 73
williamsi 66
winchelli 89
Aviculo-pectininæ 32
Aviculopinna 72
americana 62, 72, 89
pinnæformis 32
Axinæa 98, 102, 111, 160, 215, 216
barbarensis 215, 216, 217
subimbricata 89
wyomingensis 111
Axinea 217, 267, 271
alta 267
conradi 271
holmesiana 160
mortoni 267
Axininæ 34
Axinus 253
rotundatus 20
(Schizodus) ovatus 19, 20
securis 258
Axophyllum 92, 121, 177
rudis 92, 121, 177
Azthemis 217

B.

Baculites 28, 93, 94, 103, 135, 200
——? 200
anceps var. obtusus 94, 103
asper 103
baculus 93
chicoensis 93
compressus 14, 103
grandis 14, 103
inornatus 97
occidentalis 27, 93
ovatus 14, 17, 103, 135
syriacus 200

Page.

Bacalitidæ 103, 125
Ballicilla 198
Bairdia ? —— 257
Bakevellia 32, 132
parva 19, 20, 32, 132
Balanus 227
estrellanus 217
Barbatia 98, 143, 158
barbulata 158
coalvillensis 143
(Polynema ?) parallela 98
Bariosta 105
Baroda subelliptica 143
wyomingensis 143
Barrandia 191
? ——? 191
mccoyi 191
Barycrinus 54, 83, 84
geometricus 83
hoveyi 83
var. herculeus 54, 83
magnificus 54, 83
mammatus 83
pentagonus 83
spectabilis 64, 84
subtumidus 83
Baraphyllum 57, 144
? ? arenarium 58
fungulus 144
Beecommatophora 135
Bathycomphalus 34, 106, 137, 161
Bathyurellus (Asaphiscus) bradleyi 76
Bathyurus 185, 191, 234
armatus 186
? congeneris 191
? haydeni 76
longispinus 185
pogonipensis 234
serratus 76
? similimus 191
? tuberculatus 191
Botocrinus 42, 54, 81
casseday anus 54, 81
christyi 81
(Eretmocrinus) neglectus ... 54, 81
remibrachiatus. 81
pyriformis 81, 87
quasilus 54, 81
trochiscus 54, 81
verneuillianus 82
Beaumontia 147, 158
? solitaria 147, 158
Belemnitella 105
? bulbosa 15, 105
paxillosa 49
Belemnites 31, 35, 95, 111, 176, 263
densus 19, 35, 95, 179, 263
macritatis 176
nevadensis 111
pacificus 35
paxillosa 49
Belemnitidæ 31, 35, 105, 111, 263
Belemnocrinus 50, 118, 120
typus 118
whitii 48, 50

Page.

Bellerophon 24, 42, 46, 55, 74, 81, 117, 118, 126, 129, 132, 138, 147, 151, 154, 164, 178, 195, 197, 235, 245, 247, 248, 258
allegoricus 126, 129
bilabiatus 117
bilobatus 248
bowmani 138
(Bucania) platystoma 55
carbonarius 74, 178
combsi 195
crassus 24, 46, 132, 178
cyrtolites 42
gibsoni 154
inspeciosus 151
interlineatus 51
leda 195
lyra 195
mæra 195
majusculus 197
marcouanus 51
marcouianus 74
micromphalus 226
montfortianus 74
nelcus 235
newberryi 67, 81
nodocarinatus 178
panneus 118
patulus 81
pelops 195
percarinatus 74, 178
perelegans 117
perplexa 195
propinquus 67, 81
scriptiferus 118
strictus 223, 226
sublævis 154
subpapillosus 147, 164
textilis 197
undulatus 223, 226
vinculatus 117
Bellerophontidæ 39, 132
Bellinurus 36, 46
danæ 36, 46
Beyrichia 121, 188, 191, 195
bella 188
cincinnatiensis 187
fætoidea 191
lithofactor 120
var. velata 120
petrifactor 121
var. velata 121
(Primitia) occidentalis 195
Blastoidea 36, 44, 126
Brachiopoda 20, 23, 24, 26, 27, 30, 31, 33, 41, 43, 44, 45, 55, 56, 57, 58, 59, 60, 61, 62, 64, 68, 72, 78, 80, 85, 89, 90, 91, 92, 94, 95, 96, 108, 109, 110, 116, 118, 121, 126, 127, 129, 130, 131, 133, 138, 146, 147, 148, 149, 151, 154, 155, 162, 163, 165, 177, 189, 190, 192, 196, 225, 232, 233, 234, 235, 236, 250, 253, 255, 257, 260, 261, 262, 265, 274
Brachydontes 140, 158, 160
Brachyspira 159
Breviarca 96, 267

	Page.
Brevisarca mifflordi	267
Bryozoa	19, 154, 252, 255, 257, 274
Bucanella nana	66
Bucardinæ	34
Buccinidæ	103
Buccinofusus diegoensis	222
Buccinopsis	219
parryi	219
Buccinum	205
† devinctum	206
integrum	205
† nebrascensis	14
sowerbii	221
† vinculum	13
Buchiceras	125
swallovi	125
Bulimea	166
Bulimus limneiformis	16, 221
nebrascensis	16
perversus	221
† teres	15, 221
† vermiculus	15, 221
Bulinus	106, 161
stavus	139, 161, 169
disjunctus	145, 161, 169
floridanus	170
longiusculus	106, 161, 169
rhomboideus	106, 161, 169
subelongatus	106, 161, 169
Bulla	212, 214
dekayi	220
jugularis	212, 214
minor	14
occidentalis	14
petrosa	50, 206
subcylindrica	16
volvaria	14
Bullidæ	101, 264
Bursacrinus	26, 59, 118
confirmatus	118
wachsmuthi	26, 59
Busycon †	211, 213
bairdi	16
† blakei	211, 213
† oregonensis	50
Buthus †† carbonarius	53
Bythinella	159
gregaria	70, 159, 170

C.

Cœlenterata	177
Calceocrinus	63, 82, 83, 188
barrandii	188
† bradleyi	63, 83
† wachsmuthi	63, 82
Calceola	99
Callianassa	153
danai	13
oregonensis	227
ulrichi	153, 157
Callipteris	149
sullivanti	149
Callista	28, 100, 269
(Aphrodina †) tenuis	100
Callista delawarensis	269
deweyi	28
(Dosiniopsis) deweyi	100
nebrascensis	100
orbiculata	100
owensana	100
eufalensis	46
† pellucida	100
Callocarca	86
Callomena	195
occidentalis	196
Calobates	101
Calophyllum	223
Calymene	73, 148
bufo	267
senaria	73, 148
Calymenidæ	260, 261
Calyptræa trochiformis	221
Camæna	166
Camarophoria	42, 196, 257
† bisulcata	256, 257
cooperensis	196
globulina	52
schlotheimi †	257
subtrigonia	43
swalloviana	257
Camerinidæ	31
Cameroceras	129
Campeloma	107, 112, 162, 166
macrospira	112, 162, 166
(Melanthd) macrospira	66
multilineata	107, 162, 169
multilineatum	221
multistriata	107, 162, 169, 221
producta	166, 169
vetula	107, 162, 169
vetulum	221
Campophyllum	72, 109, 177
† texanum	257
torquium	72, 177
Camptonectes	33, 49, 95, 127, 133, 164, 236, 262
(Amusium) burlingtonensis	266
bellistriata	95
bellistriatus	33, 49, 133, 236, 262
calvatus	220
extenuatus	33, 49, 180, 236, 262
parvus	266
pertenuistriatus	236
platessa	127, 133
platessiformis	164
stygius	127, 133
Camptopteris remondi	246
Campylodiscus americ †	229
Cancellaria	210
petrosa	210
Caninia	223
Cantharis vaughni	49
Cantharulus	103
Cantharus	103
(Cantharulus) vaughani	103
julesburgensis	157
Canthyria	105
Caprina	214, 218
occidentalis	215, 218

Page.

rina planata **215**, 218
rinella coraloidea **13**
rotina 93
(Requienia?) bicornis 93
texana 243
sa 220
texana **220**
ularia discoidea 220
ulidæ 132
ulus fragilis **14**
occidentalis **13**, 48
onarca **64**, 92
gibbosa **64**, 92
lidæ 34, 99, 111, 262, 271
linia 164, 224
? costata 225
cuneata **224**
? cuneata 225
? exilis 224
præcisa **164**
recta **224**, 225
diola 197
? filicostata **197**
diomorpha 24, 79, 86, 89, 119, 236, 258
(Cardiopsis?) parvirostris .. **119**
missouriensis 86, 236
? ? obliquata **68**, 70
radiata **24**
subglobosa **89**
diopsis **26**, 42, 119
radiata 42
dissoides 34
dita 211, 213, 216, 218, 219, 270, 271
abbreviata 50
brittoni **271**
carinata 50
eminula 218
intermedia **270**
littoralis 271
monilicosta 50
occidentalis 50, 216
perantiqua 271
planicosta **211**, 213, 219
radians 50
rhombea **271**
subtenta 50, **266**
subtetrica **220**
dium 28, 93, 99, 111, 143, 207, 208, 209, 210, 211, 212, 213, 218, 268
australe 225
bellulum **93**
bellum **208**
biseriatum **207**, 210
(Cerastoderma) modestum 50
choctawense 159
congestum **218**
crebricostatum **207**, 209
(Criocardium) dumosum 268
multiradiatum 268
speciosum 99
curtum 111
elegantulum 47
eufaulensis 268
ferox **225**
(Hemicardium?) curtum **28**
hermosense **207**

Page.

Cardium iowensis **248**
kansasense **70**, 99
linteum **210**, 212
mediale **218**
modestum 50, **211**, 213
multistriatum 253, **255**
ovulum **208**
pauperculum **70**, 143
pertenue **28**
(Protocardia) filosum **218**
multistriatum 218
salinæense **70**
texanum 218
(Protocardium) perelongatum ... **268**
rarum **256**
ripleyanum 268
ripleyense 268
sancti-sabæ 47
scitulum **17**
shumardi **21**
speciosum **16**
subcurtum 111
subquadratum **256**
syriacum **207**
trite **143**
Caricella flemingii 221
Carinifex 112
binneyi **65**
tryoni var. concava **65**
(Vorticifex) binneyi 112, 166, 170
tryoni **65**, 112, 166, 170
Caryatis 100, 271
ovalis **271**
? veta **271**
Caryophyllia 142
egeria 142
johannis **142**
Cassidula 219
(Lacinia alveata) 219
Cassidulus patelliformis 222
Cassiope 127, 134
whitfieldi **127**, 134
Cassiopella **139**, 162
turricula 162, 169
Catenipora escharoides 247
gracilis **232**
Catillocrinus 54, 59, 83
bradleyi **54**, 83
wachsmuthi 59
Catillus 97
obliquus 221
Catopygus patelleformis 222
Cavolinidæ 31
Cellepora tubulata 222
Cemoria crucibuliformis 50
Centrocrinus 38, 43
Centronella 56
billingsiana **56**
Cephalopoda 20, 21, 22, 25, 27, 28, 31, 33, 35, 38, 39, 40, 42, 44, 46, 55, 59, 63, 65, 67, 68, 74, 79, 80, 81, 84, 87, 91, 93, 94, 95, 103, 109, 110, 111, 117, 121, 126, 129, 132, 135, 138, 144, 146, 149, 154, 159, 162, 165, 179, 191, 195, 198, 226, 236, 250, 256, 258, 261, 262, 265
Cerastoderma 99

Page.

Ceratiocaris 61, 89
(Colpocaris) bradleyi 68, 89
elytroides 68, 90
sinuatus 53, 61
(Solenocaris) strigata 68, 90
Ceraurus 79, 186, 191, 248
——? 191
icarus 79
rarus 186
pleurescanthemus 185
Cercomya 269
peculiaris 269
Ceriphasiidæ 106, 112, 139
Cerithidea 161, 180
? nebrascensis 169, 180
(Pirenella?) nebrascensis 106, 161
Cerithiidæ 106
Cerithiopsidæ 102
Cerithiopsis 102
morseuensis 102
Cerithium 180, 210
bilineatum 210
fremonti 221, 231
mediale 206
nebrascensis 16
nodulosum 221, 231
pillingi 180
tenerum 221, 231
totium-sanctorum 180
Chænocardia 86
ovata 86
Chænomya 32, 38, 73, 84, 86
cooperi 32
hybrida 38
leavenworthensis 32, 73
minehaha 73, 86
rhomboidea 38, 84
Chætetes 55, 131, 138, 147, 158, 257
? ? dimissus 147, 158
lycoperdon 231
mackrothii 257
milleporaceus 131
muscatinensis 138
petropolitanus 55
Chamidæ 180, 268
Chariocephalus 190, 234
? tumifrons 190, 234
Chemnitzia 48, 103, 134, 258
cerithiformis 103
corona 48
meekiana 48
swalloviana 258
? texana 48
Chenopus 207, 209, 210
——? 210
induratus 207
syriacus 208
turriculoides 207
Chetetes crinita 226
gracilis 226
ovata 226
tasmaniensis 226
Chione 100
(Liophora) alveatus 50
athleta 50

Page.

Chione (Liophora) latilirata 50
Chiton 87
carbonarius 87
Chladocrinus 33
Chlamys 97
nebrascensis 97
Chonetes 24, 31, 43, 60, 62, 72, 85, 94, 119, 127, 131, 177, 192, 235, 245, 257
deflecta 192
filistriata 193
flemingi? 257
geniculata 119
glabra 52, 72
granulifera 72, 131, 250
hemispherica 192
illinoisensis 60
? iowensis 250
loganensis 235
macrostriata 193
mesoloba 131
? ? millepunctata 64, 85
mucronata 19, 20, 31, 53, 193
permiana 257
planumbona 24, 42
platynota 127, 131
pusilla 62
setigera 192
smithii 85, 274
variolata 222
verneuliana 20, 72, 177, 245
var. utahensis 94
Chonophyllum 165
sedaliense 165
Cibota 267
multiradiata 267
obesa 267
rostellata 267
uniopsis 267
Cidaris 206
hemigranosus 159
Cinulia 29, 101
(Avellana) pulchella 43
naticoides 43
(Oligoptycha) concinna 102
Cladocora [?] lineata 49
Cladocrinus 33
Cladodus occidentalis 20
Cladopora 155, 192
pulchra 192
reticulata 155
Clasteria 227
australis 227
Clathropora 155
flabellata 231
frondosa 155
Clathropteris 246
Clausilia contraria 221
teres 221
vermicula 221
Clavagella 270
armata 270
Clavatula? 211, 213
? californica 211, 213
Clavelites (Peistochilus) scarboroughi 49
Clavella vicksburgensis 222

Page.

Clavifusus altile 222
cooperi 222
Cleidophorus 82
Cleobis 223, 225
gracilis 224
grandis 223
recta 224
Clidophorus 79
(Nuculites ?) fabula 79
pallasi 51
(Pleurophorus) simplus 51
solenoides 51
Climacograptus 129
Climopistha 64, 80, 86, 178
antiqua 66, 80
radiata 178
var. levis 64, 86
Clisiophyllum 30, 223
gabbi 30
Closteriscus 102
tenuilineatus 102
Clydonites 110, 239
lævidorsatus 110, 239
Clydonitidæ 110, 239
Clypeaster jonesii 222
rogersi 222
tumidus 222
Cocconeis concentrica 220
finnica 220
gemmata 220
lineata 220
oblonga 220
præterita 263, 220
punctata 220
Coccosema asperum 208, 220
cistula 220
cymbiforme 208
gibbum 220
gracile 220
lanceolata 220
lunula 220
Codonites 64, 83, 87
gracilis 64, 88
stelliformis 83, 87
Cœlocrinus 42, 117
concavus 43
subspinosus 117
Cœlopleurus infulatus 222
Cœlospira concava 36
Coleolus 195
lævis 195
Colcoprion 191
minuta 101
Colpocaris 89
Columna 106, 161
teres 106, 161, 169
vermicula 106, 161, 169
var. contraria 106
Columnaria 223
? sexradiata 49
thomii 223
Colus 212, 214
arctatus 50, 212, 214
Comarocystites 37, 54
shumardi 37, 54

Page.

Comarocystites shumardi var. obconicus ... 37, 54
Combophyllum 62
multiradiatum 62
Complanaria 99
Conactæon 29
Conchifera 21, 22, 116, 119, 127, 130, 133, 133, 135, 136, 137, 138, 140, 142, 144, 146, 147, 151, 153, 155, 158, 159, 160, 162, 163, 165, 178, 250
Concholepas pygmæa 221
Conchopeltis 185
alternata 185
minnesotensis 185
Confervites ? tenella 227
Coniferæ 226
Conocardium 38, 80, 92, 117, 130, 194
nevadensis 194
obliquum 38, 92
ohioense 66, 80
pulcellum 117
trigonale 80
Conocephalites 188, 234
calciferus 186
hartii 186
(Pterocephalus) laticeps 234
subcoronatus 234
Conocoryphe 108, 129, 193, 234
(Bailiella) baileyi 198
(Conocephalites) kingii 65
elegans 198
matthewi 198
(Ptychoparia) gallatinensis ... 70
kingii 198, 129
walcotti 198
Conodictyum 40
radiatum 40
Conomitra fusoides 221
Constellaria 155
antheloides 155
Conularia 32, 81, 84, 89, 113, 133, 149, 151, 165, 185, 195, 198, 226
byblis 113
crustula 151, 165
elegantula 67, 81
inornata 226
levigata 226
micronema 67, 89
missouriensis 84, 149, 198
molaris 133
multicostata 39
newberryi 89
quadrata 185
subcarbonaria 39, 84
tenuistriata ? 226
victa 113
whitei 39
Coralliochama 180
orcutti 180
Corbicula 99, 105, 112, 127, 149, 169, 198, 266
æquilateralis 70
annosa 266
aughevi 166, 168
berthoudi 166, 168
cardiniæformis 149, 169
cleburni 149, 169, 168
crassatelliformis 70

Page.

Corbicula (Cyrena?) securis ... 76
cytheriformis ... 105, 160, 169
? emaceratа ... 206
? fracta ... 70
? var. crassiuscula ... 77
(Leptesthes) cardinisæformis ... 169
fracta ... 160, 168
macropistha . 141, 160, 168
planumbona . 88, 160, 169
subelliptica ... 105, 160
subelliptica var. moreauensis ... 105
nebrascensis ... 105, 160, 168
nucalis ... 70, 99
obesa ... 140, 160, 169
occidentalis ... 105, 160, 168
powelli ... 137
pyriformis ... 168
subelliptica ... 168
? subtrigonalis ... 70, 99
umbonella ... 168
(Veloritina) bannisteri ... 77
cytheriformis ... 77
durkeei ... 112, 160, 168
inflexa ... 76
Corbis lamellosa ... 220
Corbula ... 47, 95, 101, 105, 111, 112, 134, 137, 143, 160, 207, 208, 210, 211, 213, 218, 219, 269, 272
aleihensis ... 210
(Anisorhynchus?) engelmanni ... 112
pyriformis ... 95, 112
congesta ... 207
crassatelliformis ... 160
crassimarginata ... 101
crassiplica ... 269
diegoana ... 211, 213
dubiosa ... 145
engelmanni ... 95
evansana ... 256
foulkei ... 269
? gregaria ... 15
inornata ... 18, 101
mactriformis ... 15, 161, 168
moreauensis ... 15
nasuta ... 219
nematopora ... 76, 134, 143
(Nesæra) nasutoides ... 272
occidentalis ... 218
(Pachydon) mactriformis ... 105
perundata ... 105
subtrigonalis ... 105
perundata ... 15, 160
(Potamomya?) concentrica ... 22
engelmanni ... 22
pyriformis ... 22
pyriformis ... 161
subcompressa ... 269
sublineolata ... 208
subtrigonalis ... 15, 160, 168
subundifera ... 137
syriaca ... 208
tropidophora ... 77, 160
undifera ... 77, 161, 168
var. subundifera ... 161, 168
ventricosa ... 15

Page.

Corbulamella ... 18, 101
gregaria ... 18, 101
Corbulidæ ... 101, 105, 111, 112, 134, 208, 272
Cordieria moorei ... 221
Corimya ... 209
tenuis ... 209
Cornulina armigera ... 222
Coroceras ... 110, 239
Coseneis ... 203
Costella ... 107
Crania ... 119, 121, 177, 257
modesta ... 121, 177
permiana ... 257
reposita ... 119
sheldoni ... 119
Craniidæ ... 121
Crassatella ... 93, 99, 143, 208, 211, 213, 217, 237, 269, 263, 268, 270, 271
alta ... 211, 213, 271
cimarronensis ... 143
collina ... 217
conradi ... 270
cuneata ... 268
declivis ... 237
delawarensis ... 268, 270
evansii ... 13
monmouthensis ... 268
obliquata ... 271
(Pachythærus) evansi ... 99
prora ... 268
shumardi ... 93
subplana ... 268
subquadrata ... 260, 263
syriaca ... 208
transversa ... 268
uvasana ... 211, 213
vadosa ... 268
Crassatellidæ ... 30, 32, 33, 34, 99, 260, 262, 263, 268
Crassatellina ... 70, 99
oblonga ... 70, 99
Crenella ... 28, 98
concentrica ... 220
elegantula ... 28, 98
granulata cancellata ... 47
Crenipecten ... 196
hallanus ... 196
Crepicephalus ... 234, 250, 259, 260, 261
(Bathyurus?) angulatus ... 234
centralis ... 261
(Loganellus) anytus ... 234
centralis ... 260
granulosus ... 234
haguei ... 234
maculosus ... 234
montanensis ... 259
nitidus ... 234
planus ... 260
? quadrans ... 234
simulator ... 234
tumisulcatus ... 234
planus ... 261
Crepidula ... 212, 214
? —— ... 206
prærupta ... 50, 206
princeps ... 212, 214

Page.

Crinoides....26, 33, 37, 40, 41, 42, 43, 44, 45, 55, 118, 121, 127, 133, 255, 262
Crinoideæ....232
Criocardium....99, 268, 271
nucleolus....**271**
Criptogamia....128
Crucibulum....212, 214
spinosum....**212**, 214
Crustacea....31, 36, 39, 46, 55, 56, 57, 58, 59, 61, 65, 67, 68, 74, 79, 80, 81, 89, 91, 108, 109, 121, 126, 129, 136, 148, 149, 153, 159, 179, 191, 195, 227, 234, 235, 250, 257
Cruziana....126, 128
linnarssoni....**126**, 128
rustica....**126**, 128
Crypta prærupta....50
Cryptoceras....39, 104
Cryptogramma floridana....220
? penita....220
Cryptomya....215, 216
ovalis....**215**, 216
Cryptonella....193
? circula....**193**
pinonensis....**193**
Cryptorhytis....103
Ctenobranchiata....34
Ctenoides acutilineata....47
denticulata....47
squarrosa....47
Cucullæa....98, 111, 208, 209, 218
exigua....**16**
haguei....**111**
(Idonearca ?) cordata....98
nebrascensis....98
shumardi....98
lintea....**208**
nebrascensis....**250**
ononcheila....220
opiformis....**209**
paralella....**208**
subrotunda....**208**
terminalis....**218**
transversa....220
(Trigonarca ?) obliqua....**111**
? Cucullæarca....98
Cucullifera....**222**
Cupellæocrinus....38
Cyathaxonia....52
Cyathocrinites....54, 82, 87
fragilis....**54**, 82
? poterium....83
sculptilis....82
tenuidactylus....**54**, 82
Cyathocrinus....23, 26, 37, 38, 42, 43, 45, 53, 60, 81, 117, 118, 150, 154, 163, 249, 251
—— ?....19
angulatus....**23**, 43
arboreus....**38**, 60
cornutus....**249**, 251
? crassus....**23**
enormis....37, 60
farleyi....**40**, 60
granuliferus....255
inflexus....52
iowensis....**249**, 251

Page.

Cyathocrinus kelloggi....**118**
lamellosus....**117**
multibrachiatus....154
? poterium....**64**
quinquelobus....**37**, 60
ramosus....52
rigidus....**118**
saffordi....**23**, 43
sangamonensis....**23**, 45
scitulus....**23**, 27
sculptilus....27, 42
stillativus....150, 163
subtumidus....**37**
wachsmuthi....**26**, 60
Cyathophycus....**186**
reticulatus....**186**
subsphericus....**186**
Cyathophyllidæ....62, 108, 109, 121, 223
Cyathophyllideæ....232
Cyathophyllum....62, 108, 109, 223
—— ?....**192**
articum....**62**
caliculare....**247**
(Campophyllum ?) nevadense....**109**
corinthium....**247**
corniculum....192
davidsoni....192
helianthoides....247
palmeria....**108**
profundum....248
rugosum....192
subcæspitosum....**109**
turbinatum ?....247
undulatum et multiplicatum **247**
vesiculosum ?....247
Cyathopora iowensis....247
Cyclas....99, 215, 217
estrellana....**217**
formosa....**15**
fragilis....**15**
permacra....50, **217**
subellipticus....**15**
tetrica....**215**
Cyclina ? circularis....48
Cyclobranchiata....34
Cyclonema....79, 80, 148
bilix....79, 148
crenulata....**67**, 80
Cyclopteris....246
moquensis....**246**
Cyclora....79
minuta....79
? parvula....79
Cylichna....101
dekayi....220
petrosa....50
scitula....**21**, 101
? volvaria....101
Cylichnidæ....101
Cylindrites....29
Cymatopleura ? campylodiscus....**203**
Cymbella gibba....**203**
Cymbopora....100
Cymella....48, 101, 134, 261, 264, 268

Page.

Cymella bella 101
meeki 268
Cymomia lamarckii 222
Cyphaspis 148, 191
† brevimarginatus 191
christyi 148
Cyphosoma texanum 223
Cypricardella 117, 194, 197
quadrata 117
Cypricardia 225, 260, 262
acutifrons 226
arcodes 226
(Avicula †) veneris 226
imbricata 226
occidentalis 232
præcupta 226
† rigida 117
rugulosa 224
siliqua 226
simplex 226
sinuosa 224
Cypricardinia 90, 194
carbonaria 67, 90
indenta 194
Cypricardites 54, 55, 79, 248
——† 55
† carinata 79
obliquus 55
sterlingensis 79
Cyprida 121
Cypridinidæ 121, 136
Cyprimeria 92, 93, 111, 269
† crassa 93
densata 269
depressa 269
excavata 269
heilprini 269
spissa 269
subalata 111
† tenuis 92
Cyprina 99, 176
arenaria 18, 47
compressa 18
cordata 18
† dallii 176
humilis 21, 47
laphami 48
ovata 18, 99
var. compressa 99
subtumida 18, 48
Cyprinidæ 260, 266, 268, 271
Cypris 136
——† 136
Cyrena 99, 135, 137, 143, 158
arenaria 47
carletoni 76, 158, 167
(Corbicula) cytheriformis 21
durkeei 66
dakotensis 99, 167
holmesi 88
inflexa 143
intermedia 15
moreauensis 15
occidentalis 15

Page.

Cyrena securis 143
(Veloritina) durkeei 135
erecta 137
Cyrenidæ 90, 105, 112, 135
Cyrtia 119
curvilineata 119
Cyrtina 57, 58, 82, 198
billingsi 62
dalmani 57
davidsoni 193
hamiltonensis 62, 193
panda 62
triquetra 58
Cyrtoceras 25, 46, 59, 91, 122, 123, 125, 226
(Aploceras) curtum 46
cessator 226
conicum 247
curtum 25, 27
dardanus 91
dictyum 138
† dilatatum 25, 46
nevadense 195
ohioense 67
ohiensis 81
sæculum 30
Cyrtoceratites 81
Cyrtochilu 198
Cyrtolites 58, 79, 121, 191, 224
† costatus 79
dyeri 79
† gillianus 191
imbricatus 56
(Microceras) inornatus 79
ornatus 79
sinuatus 191, 234
Cysteophyllum 62, 155, 192, 223
americanum 193
var. articum 62
vesiculosum 155
Cystidea 27
Cystoidea 54, 77
Cystoscirites † 227
Cythere 74, 79, 121
cincinnatiensis 68, 79
nebrascensis 74
simplex 191
Cytherea 207, 211, 213, 216, 218, 219
deweyi 15, 48
lamarensis 48, 159
lenticularis 220
leonensis 48, 218
† (Meretrix) dariena † 216
missouriana 48, 203
nebrascensis 15, 48
nuttali 219
orbiculata 13, 46
oregonensis 30
ovata 220
owenana 16, 48
parvula 231
pellucida 16, 48
syriaca 207
tenuis 13, 48
texana 48, 218

Page.

Cytherea tippana 48
vespertina 50
Cytherodon 194

D.

Dalmania 39
danæ 39
Dalmanites 57, 58, 79, 81, 109, 186, 195
carleyi 69, 79
danæ 56
intermedius 186
meeki 195
(Odontocephalus) egeria 58
ohioensis 67, 81
tridentiferus 57
Dawsonella meeki 167
Decapoda 35, 37, 46, 61
Delphinula depressa 221
plana 221
Delthyris 247, 248
eurutelnes 247
expansus 248
Deltodus mercurei 246
Dendrocrinus 55, 77, 188
casei 66
oswegöensis 55
retractilis 188
Dendrograptus 187
compactus 187
simplex 187
tenuiramosus 187
Dentalidæ 34, 101, 132, 264
Dentalium 26, 34, 44, 74, 86, 93, 95, 101, 127, 132, 209, 264
annulostriatum 65, 86
canna 127, 132
cretaceum 209
(Ditrupa?) pusillum 221
fragilis 14
gracilis 13, 101, 264
komooksense 93
meekianum 74, 86
nanaimoensis 17
pauperculum 21
? subquadratum 22, 34, 95
thallus 50
venustum 26, 43
Diadora 216
crucibuliformis 216
Dimca 132, 133, 134, 135
Dianchora 266
echinata 266
Diastropha 107
Dibranchiata 35, 105, 263
Dicellocephalus 126, 129, 189, 191
? angustifrons 189
bilobatus 189
? expansus 190
finalis 191
flagricaudus 126, 129
inexpectans 191
marica 189
nasutus 189
osceola 189
? quadriceps 189

Page.

Dicellocephalus richmondensis 189
iole 189
Diceras 268
dactyloides 268
Dichocrinus 23, 42, 43, 54, 63, 82, 83, 84, 91, 118, 249, 251
angustus 118
constrictus 23, 43
conus 23, 42
cornigerus 84
crassitestus 118
expansus 54, 83
ficus 83, 91
lineatus 63, 82
ovatus 249, 251
pisum 63, 82
(Pterotocrinus) chesterensis 23
crassus 23
striatus 249, 251
Dicraniscus 70
ortoni 70
Dicranobranchia 132
Dictyonema fenestrata 232
Dielasma 127, 130, 132
? bovidens 127
Dikelocephalus 231, 234, 250
bilobatus 234
flabellifer 234
gothicus 234
granulosus 250
iowensis 249
miniscensis 250
minnesotensis 250
multicinctus 234
pepinensis 250
quadriceps 234
washsatchensis 234
Dimyaria 98, 105, 133, 267
Diodora crucibuliformis 50
Dione 100
augustifrons 50
? brevilineata 50
decisa 50
eufalensis 48
lamarensis 48
leonensis 48
[?] meekiana 48
missouriana 48
nebrascensis 48
orbiculata 48
oregonensis 50
ovata 220
owenana 48
? pellucida 48
[?] ripleyana 48
[?] tenuis 48
texana 48
tippana 48
uniomeris 50
vespertina 50
Diphyphyllum 108, 155
archiaci 155
arundinaceum 155
fasciculum 108
simcöense 192

	Page.
Diphyphyllum stramineum	155
Diplodon	105
Diplograptus	129
Diploschiza	266
cretacea	266
Discinidæ	110
Discina	85, 89, 110, 119, 177, 192, 196
—— ?	110, 192
capax	**119**
connata	**196**
convexa	177
lodensis	192
lugubris	49
manhattanensis	**20**
minuta	192
multilineata	49
newberryi	196
nitida	85, 177, 196
(Orbiculoidea) newberryi	89
? pleurites	**89**
tenuilineata	**20**
Discites	89, 104
tuberculatus	**250**
Discoflustrellaria bouei	220
Discophyeus	**186**
typicalis	**186**
Discoplea oregonica	229
atmosphærica	203
Discoscaphites	104
Discosorus conoideus	232
Dispotæa	205
constricta	**205**
Dithyrocaris	87, 179
carbonarius	**65**, 87, 179
Ditrupa subcoarctata	221
Docoglossa	102
Dolabra	56
? carinata	**68**
sterlingensis	**40**, 56
Dolatocrinus ornatus	66
Doliopsis	**222**
Dolium petrosum	**206**
Donacilla	99
Donacinidæ	269
Donax	269
fordii	269
? protexta	50, 206
Dorycrinus	54, 82
canaliculatus	82
quenquelobus var. intermedius	54, 82
roemeri	**54**, 82
unicornis	82
Dosinia	211, 212, 215, 216, 217, 260, 262, 264, 269
alta	**211**, 213, 215, 216, 217
erecta	**269**
gabbi	**269**
gyrata	220
jurassica	**260**, 262
longula	**215**, 216, 217
missouriana ?	264
montana	**217**
subobliqua	**217**
Dosinia ? tenuis	**27**
? Dosiniopsis	100
lenticularis	220
Drepanochilus	48, 102
Dreissena leucopheata	189
Drillia lonsdalii	222
texana	222
Dymyaria	122, 135
Dysnomya	105
Dystactella	194
insularis	**194**

E.

Ecculiomphalus	195
devonicus	**195**
Echinianthus mortonis	222
Echinodermata	19, 24, 26, 33, 37, 40, 41, 42, 43, 44, 54, 55, 56, 58, 59, 60, 64, 66, 68, 72, 77, 81, 84, 91, 94, 96, 118, 127, 130, 131, 133, 136, 138, 144, 147, 148, 149, 150, 151, 154, 158, 163, 165, 196, 206, 209, 210, 236, 255, 260, 261
Echinoidea	23, 42, 43, 44, 54, 60, 96
Echinosphærites ?	**232**
Echinus	206, 209, 210
bullatus	**210**
infulatus	222
kerakensis	**209**
libanensis	**210**
syriacus	**206**
Edmondia	38, 45, 73, 86, 89, 109, 117, 178, 197, 236, 258
aspinwallensis	**70**, 73, 178
? calhouni	**19**, 20
burlingensis	**117**
? circularis	**197**
? glabra	**73**
medon	**197**
myrina	**236**
? nebrascensis	73
ovata	87
peroblonga	**38**, 86
? pinonensis	**109**
reflexa	**73**
suborbiculata	258
subtruncata	**73**
tapesiformis	**89**
unioniformis	45
Edriocrinus	57
pocilliformis	57
Egeta	99
Egeria inflata	220
plana	220
Electroma	97
Endolobus	39, 47
Enclimatoceras	**176**, **239**
(Nautilus) ulrichi	**176**
Encrinites	253
Encrinurus	186
trentonensis	**186**
varicostatus	**186**
Endoceras multitubulatum	191
proteiforme	191
Endocostea	**260**, 263
sulcata	263
typica	**260**, 263
Endopachys maclurii	220
Entalis	101

Page.

Entalis paupercula ... 101
Entolium ... 35, 73, 86, 89, 178
aviculatum ... 73, 86
shumardianum ... 89
Ensis curtus ... 50
Entomostraca ... 36, 46, 61, 79, 89
Eocidaris ... 72, 83
hallianus ... 52, 72
squamosa ... 63
? squamosus ... 83
Eocystites ... 198
primævus ... 198
Eoscorpius ... 53, 61
carbonarius ... 61
Ephithemis ... 208
Eretmocrinus ... 41, 54
Eridophyllum ... 155
strictum ... 155
Eriphyla ... 99
gregaria ... 99
Eriocrinus ... 35, 36, 37, 45, 63, 72, 82, 85, 150, 163
antiquus ... 63, 82
(Cariocrinus) planus ... 163
inflexus ... 163
conoideus ... 37, 45
nebrascensis ... 35, 36
planus ... 150
tuberculatus ... 37, 45
typus ... 35, 36, 45, 72, 85, 163
whitei ... 82, 63
tubulata ... 222
Eschara concentrica ... 273
tuberculata ... 273
Ethmophyllum ... 53
whitneyi ... 53
gracilis ... 53
Etonia ... 57
peculiaris ... 57
Eudiscoceras ... 110, 239
gabbi ... 110
Eucalyptocrinus ... 148
crassus ... 148
Eucheilodon ... 237
creno-carinata ... 237
Euconactæon ... 29
Eulima ... 25
sciculata ... 221
chrysalis ... 77
funicula ... 77
? inconspicua ... 77
lugubris ... 221
notata ... 221
peracuta ... 25, 27
scale ... 221
? subfusiformis ... 255
Eulimella ... 134, 144, 158
funicula ... 134, 144
? chrysallis ... 158
? inconspicua ... 158
Eumicrotis ... 29, 32, 33, 45, 178, 236
curta ... 32, 33, 49, 236
hawni ... 32, 178
var. ovata ... 32
sinuata ... 45
Euomma ... 25

Page.

Euomma ? salteri ... 25
Eunotia amphioxys ... 229
argus ... 229
gibba ... 203, 229
gibberula ... 229
granulata ... 229
librile ... 203, 229
subulata ... 229
textricula ... 229
uncinata ... 229
webstermanni ... 229
zebra ... 229
zebrina ... 229
Euomphalidæ ... 132
Euomphalus ... 25, 30, 80, 117, 118, 130, 132, 138, 165, 179, 195, 197, 235, 248
ammon ... 117
decewi ... 80
eurekensis ... 195
laxus ... 130, 235
michleranus ... 233
(Omphalotrochus) whitneyi ... 30
(Phanerotinus) laxus ... 195
planodorsatus ... 25
pernodosus ... 132
(Raphistoma ?) rotuliformis ... 65
trochiscus ... 65
roberti ... 118
rugosus ... 51, 87, 179
springvalensis ... 138, 165
(Straparollus) ophirensis ... 235
subrugosus ... 197
utahensis ... 235
subplanus ... 232
umbilicatus ... 25
Eupachycrinus ... 72, 84, 85, 136, 163
boydii ... 64, 85
fayettensis ... 85
platybasis ... 136, 163
tuberculatus ... 85
verrucosus ... 72
Euphoberia ... 53, 61
armigera ... 53, 61
major ... 53
?? ——— ... 61
Euproops ... 61, 179
danæ ... 61, 179
colletti ... 179
Euptycha ... 29
Eurydesma ... 225
cordata ? ... 224, 225
elliptica ... 224, 225
gibbosa ... 225
globosa ... 224
sacculus ... 225
Eurypteridæ ... 61, 187
Eurypterus ... 61, 179
(Anthraconectes) masonensis. 53, 61, 179
Euspira ... 143, 158
coalvillensis ... 143
utahensis ... 158
Eutomoceras ... 110, 239
laubei ... 110
Eutropia haleana ... 48

Page.

Eutropia perovata 48
punctata 48
Evactinopora **38**, 40, 60
grandis **60**
radiata **38**, 60
sexradiata **60**
Exogyra 93, 133, 142, 151, 158, 173, 206, 208, 215, 219, 266
arietina 173, 219
aquila 173
boussingaultii 206
columbella **93**, 173
costata 173, 219, 266
var 219
fluminis 133
densata **208**
var 208
fimbriata 173, **215**, 219
flabellatta 243
forniculata **151**, 158, 173
fragosa 173, **215**, 219
interupta 173
lævinscula 133, 173, 219
matheroniana 173, 219
parasitica 173
plicata 173
ponderosa 133, 173, 255
texana 173, 255
valkeri **142**
walkeri 173
winchelli **151**, 158, 173

F.

Fabulina 100
Fasciolariidæ 103, 264
Fasciolaria 103, 159, 264
buccinoides **14**, 103
cretacea **14**
? (Cryptorhytis) cheyennensis .. 103
contorta 264
flexicostata 103
fusiformis 264
(Mesorhytis) gracilenta 103
moorei 221
(Piestocheilus) alleni **159**
cretacea 103
culbertsoni 103, 264
galpiniana 103
scarboroughi ... 103
plicata 221
Faviphyllum ? rugosum **232**
Favistella 130, 155
stellata 130, 155
Favositidæ 62, 108, 109
Favosites 36, 62, 108, 117, 126, 130, 148, 155, 156
——(?) 156, **192**
basaltica 156, 192
divergens 130
favosus 155
hemispherica 192
maxima ? 247
polymorpha 62, 156, 247
var 108
dubia 156
ramosa 247

Page

Favosites [whitfieldi] **117**
whitfieldi 126
Fenestella 60, 72, 88, 226, 253
——? **72**
ampla 226
corticata **273**
delicata 67, 88
fossula 226
gracilis **226**
intermedia **273**
internata 226
media **226**
(Multiporata?) var. lodiensis 88
norwoodiana **273**
popeana 267, **273**
shumardii 72, **273**
subretiformis **273**
(Lyropora) retrorsa **60**
trituberculata **273**
variabilis **273**
Ficopsis cooperi 221
mammillatus 221
penitus 221
remondii 221
Ficus mammillatus 221
modestus 50
[? ?] ocoyanus 50
Fishes 20
Fissurella 30, 212, 214
crenulata 212, 214
Fistulipora 71, 156, 192
canadensis 156
nodulifera 72
Flabellatæ 34
cuneiforme 220
Foraminifera 19, 29, 31, 64, 71, 85, 91, 177, 250, 257
Forbesiocrinus 23, 26, 37, 44, 60
agassizi var. giganteus **26**, 60
? norwoodi **23**
monroensis **26**
wortheni 83
? semiovatus **23**
Fragillaria 268
acuta 229
amphicephala 229
rhabdosoma ? 203, 229
Fragum 268
tenuistriatum **268**
Fulvia 268
tenuis **268**
Fungidæ 62, 86
Fusilina 29, 31, 71, 85, 131, 177, 245
cylindrica 19, 29, 31, 71, 131, 177, 245
var. ventricosa **19**
elongata **256**, 257
gracilis **29**, 85, 87
robusta **29**
ventricosa 85, 87
Fusimitra ? lineata 221
? minima 221
Fusispira 234
compacta **234**
Fusus 103, 144, 159, 209, 237, 264
arctatus 50
cheyennensis **261**, 264

Page.

Fusus cooperi 221, 222
conybearii 222
constrictus **13**
contortus **14**
corpulentus **206**
culbertsoni **14**
dakotaensis **14**, 49
ellerii **209**
? flexuocostatus **14**, 49
galpinianus **14**
geniculus **206**
haleanus 49
haydeni **256**
intertextus **18**, 49
mullicaensis 49
migrans 50
newberryi **14**, 49
nebrascensis **256**
(Neptunea?) gabbi **76**, 144
utahensis **76**
oregonensis 50
(Pleurotoma?) scarboroughi **18**
remondii 221
scarboroughi 49
? (Serrifusus) dakotensis 103
shumardi 264
(Strepsidura) marnochi **237**
subturritus **17**
subturrites 49
taitii 222
tenuilineata **13**
tenuilineatus 49
? utahensis 159
vaughani **17**, 49
? vinculum 49

G.

Gadus pusillus 221
subcoarctatus 221
Gafrarium liratum 220
Galaxias 106
Galeodea (Galeodaria) quinquecostata 222
Galerites oregonensis **227**
Galeropsis excentricus 221
Galerus excentricus 221
Gallionella **203**
crenaria 229
distans? 203, 229
granulata 229
lævis 229
punctata 229
undulata 229
varians 203
Gampsonyx 53
fimbriatus 61
Gasteropoda 20, 21, 22, 24, 26, 28, 30, 31, 32, 34, 39, 40, 42, 43, 44, 45, 56, 57, 59, 60, 63, 65, 67, 68, 74, 79, 80, 84, 86, 89, 90, 91, 93, 94, 95, 101, 105, 107, 108, 111, 112, 117, 118, 121, 126, 127, 129, 130, 132, 133, 134, 135, 136, 137, 138, 143, 147, 148, 151, 153, 154, 155, 158, 159, 161, 164, 165, 178, 191, 194, 197, 226, 232, 234, 235, 236, 250, 256, 258, 261, 264, 273
Gastrochæna 270
Gastrochæna americana 270
Gastrochænidæ 260, 263, 270
Gastrocœli 35
Gastrosiphites 35
Genota 103
Geophila 135
Gervillia 28, 98, 119, 151, 158, 164, 259, 262
(Avicula) sulcata 51
gregaria 159
longa 51
montanaensis 164
mudgeana **151**, 158
parva 51
recta **28**, 98, 262
sparsalirata **259**
strigosa **119**
subtortuosa **16**, 98
Gervilliopsis **267**
ensiformis 267
minima **267**
Gilbertsocrinus 42, 63, 82
bursa 42
calcaratus 42
(Goniasteroidocrinus) fascellus 42
(Goniasteroidocrinus) obovatus **63**, 82
(Goniasteroidocrinus) tenuiradiatus **63**, 82
Glæonema paradoxum 229
Glauconome 72, 127, 131
nereidis **127**, 131
trilineata **72**
Globiconcha [?] elevata **255**
(Tylostoma) tumida **255**
Glossidæ 99, 134
Glossopteris ampla **226**
browniana 226
? cordata **226**
elongata **226**
linearis 226
phillipsii **231**
reticulum **226**
Glossus fraterna 50
markoei 50
Glycimeris 101, 143, 217
berthoudi **143**
estrellanus 50, **217**
occidentalis 101
Glyptocrinus 77, 187
argutus **187**
baeri **69**, 77
decadactylus 77
dyeri **68**, 77
var. subglobosus 68, 77
nealli 77
parvus 77
? subnodosus **187**
Gnathodon 266
? tenuidens **266**
Gnathostomata 61, 179
Gomphoceras 39, 59, 195
(Aploceras) turbiniforme **39**
sacculum **39**
suboviforme **195**

Page.

Gomphoceras turbiniforme 59
Gomphonema clavatum † 203
gracile 229
herculaneum 229
longicolle 229
mamilla 229
minutissimum 203, 229
olar 229
Gomphonema oregonicum 229
Goniasteroidocrinus 42, 53, 63, 81, 82
tuberosus 42
Goniastitidæ 110, 132
Goniatites 25, 46, 110, 117, 132, 149, 195, 236
compactus **38, 87**
desideratus **195**
globulosus **25**, 46
var. excelsus 92
goniolobus **110**
iowensis **25**, 46
kingii **236**
lyoni **25**, 42
oweni 149
opisnus **117**
Goniobasis 95, 106, 112, 135, 137, 141, 161
arcta 95
† arcta 221
chrysaloidea **137**, 161, 168
chrysallis **70**, 161, 168
cleburni **137**, 161, 167
convexa 106, 161, 169
var. impressa 106, 169
endlichi **141**, 161, 168
fremontii 221
gracilenta 106, 161, 169
† insculpta **77**
invenusta 106, 161, 169
macilenta 161, 168
nebrascensis 106, 135, 161, 169
nodulifera **70**
† nodulosa 221
† omitta 106, 161, 169
simpsoni 95, 112
† simpsoni 221
sublævis 106, 161, 169, 221
† subtortuosa 106, 161, 169, 221
tenera 135, 170
† tenera 221
tenuicarinata 106, 135, 162, 169
† tenuicarinata 221
Goniochasma 48, 101
stimpsoni 48
Goniocylindrites 29
Goniomya 92, 100, 164
americana **15**, 100
borealis 92
montanaensis 164
Goniophora 194
perangulata 194
Gonostoma yatesii 180
Gorgoniidæ 96
Gouldia 268
conradi **268**
decemnaria 268
declivis 268
paralis 268

Page.

Grammatodon 34, 92, 262
inornatus 34, 262
† vancouverensis 92
Grammostomum phyllodes 47
Grammysia 38, 59, 89, 194, 197
arcuata 197
† hannibalensis 89, 197
minor **194**
rhomboidalis **38**, 59
rhomboides **67**, 89
ventricosa **67**, 89
Granatocrinus 44, 60, 64, 83, 84, 126, 130, 147
cornutus 44
glaber **64**, 84
granulosus 83
lotoblastus 126, 130, 147
melonoides **64**, 83
neglectus **64**, 83
norwoodi 40, 60, 83
pisum **64**, 83
projectus 60
shumardi **40**, 60
Granocarca 98
Graphiocrinus 85
dactylus 85
Graptolithus 126, 129, 187
annectans **187**
(Climacograptus) ramulus . **126**, 129
(Diplograptus) hypniformis . . 126, 129
pistis 129
quadrimucronatus 126, 129
Gratelupia † 212, 214
mactropsis **212**, 214
Griffithides 39, 198
portlocki 198
Gryphæa 28, 30, 33, 97, 133, 172, 173, 208, 219, 233, 236, 245, 259, 262, 266, 270, 271
bryani 270
var. precedens **270**
calceola 95
var. nebrascensis 28, 33, 172, 236, 262
capuloides **208**
dilatata 241, 242
var. tucumcarii 241, 243
mucronata 173
mutabilis 179
nebrascensis 180
navia 173
pitcheri 173, 219, 233, 241, 242, 243, 245, 253, 255
var. 133
navia 233, 245
sinuata var. americana 243
thirsæ 173
vesicularis 97, 173, 208, 266, 270, 271
vomer 173
Gryphæostrea 97, 270
vomer 270
Gryphorhyncus **29**
Gryphostrea eversa 220
Gulnaria 105
† Gymnotoceras **110, 239**
blakei 110, 239
rotelliforme **110, 239**

Page.

Gypidula 193
Gyraulus 84, 106, 153
Gyroceras 59, 63, 154
burlingtonensis 250
constrictum 59
cornutes 247
elrodi 154
logani 63
(Nautilus ?) inelegans 67
rockfordensis 59
(Trochoceras ?) ohioensis 67
Gyroceratites 81
(Nautilus) inelegans 81
? (Trocheras) ohioensis 81
Gyrodes 102, 111
conradi 102
depressa 111
Gyrorbis 35

H.

Hadrophyllum 165
glans 165
Haliotidæ 39
Halobia 110
(Daonella) lommeli 110
Halysites 155
catenulata 155
Haminea 101, 264
minor 101
occidentalis 101
subcylindrica 101, 264
Hamites larvatus 220
fremonti 243
leai 49
mortoni 14
verneuilii 49
Haploscapha 222
(Cucullifera) eccentrica 222
grandis 222
Harpaga tippana 48
Harpes escanabiæ 232
Harttia 198
matthewi 198
Helcion 14
alveolus 14
carinatus 14
patilliformis 14
sexsulcatus 14
subovatus 14
Helcium alveolum 21
carinatum 21
patelliforme 21
sexsulcatum 21
subovatum 21
Helicerus 224, 227
fuegiensis 224, 227
Helicidæ 106, 107, 135, 180
Helicoceras 104, 135, 261, 265
? angulatum 21, 49
tortus 18
mortoni var. tenuicostatum 104
pariense 135
tenuicostatus 19
stevensoni 261, 265
Helicotoma 191
sp. ? 191

Page.

Helix 28, 106, 107, 135, 137, 141, 153, 161
(Aglaia) fidelis 180
evansi 21
evanstonensis 141, 169
kanabensis 137, 169
leidyi 14, 107, 135, 170
(Monodon ?) dallii 180
occidentalis 17
(Patula) perspectiva 180
sepulta 153
peripheria 137, 170
riparia 137, 170
? sepulta 169
spatiosa 28, 221
veterna 28, 170
? veterna 107
vetusta 106, 161, 169
vitrinoides 17
(Zonites) marginicola 170
Helicoceras tortum 18, 49
Heliolites 155
elegans 155
Helisoma 34, 106
Helonix thallus 50
Hemiaster 96
elegans 255
? humphreysanus 18, 96
Hemicystites 78
(Cystaster) granulatus 78
stellatus 78
Hemifusus horni 221
Hemipronites 31, 56, 72, 78, 85, 89, 108, 109, 131, 177
chemungensis var. arctostriata 108
crassus 31, 72, 85, 177
crenistria 109, 131
subplanus 56
Hemitrypa ? 226
Hercoglossa 104
Heteractis ducloseii 220
Heteroceras 93, 104, 261, 265
? angulatum 49, 104
cheyennensis 49, 104
? cochleatum 104
cooperi 93
? nebrascense 104, 265
newtoni 261, 265
oweni 49
tortum 49, 104
? umbilicatum 104
Heterocrinus 37, 55, 77
(Anomalocrinus) incurvus 37
crassus 91
constrictus 77
exilis 77
exiguus 68
heterodactylus 77
(Iocrinus) subcrassus 77
juvenis 77
laxus 77
simplex 77
subcrassus 37, 55, 68
Heteromyaria 97, 263, 267
Hettangia 262
americana 76

Page.

Himantidium arcus 229
Hinnites 216
crassa **216**
crassis 49
giganteus 49
Hipponyx borealis 21
pygmæa 221
Hippurites 209, 210
liratus **210**
plicatus **210**
syriacus **209**
Holaster 206
comanchesi **243**
simplex **255**
syriacus **206**
Holectypus planatus **233**, 255
Holopea 39
(Cyclora) nana **67**
(Isonema) depressa **39**
Holostomata 264
Homala 100
Homalina 100
Homocrinus 91
angustatus **64**, 91
Hormomya 98
Huronia annulata **232**
vertebralis 232
Hyalina 106, 161
? evansi 106, 161, 169
? occidentalis 106, 161, 169
Hybocrinus 55
? incurvus 55
Hydreinocrinus 121
verrucosus **121**
Hydrobia 106, 137, 162
anthonii 221
anthonyi 106, 162, 170
? eulimoides 107, 162, 170
recta **137**, 170
subconica 107, 162, 170
utahensis **137**, 169
warrenana 106, 162, 170
Hydrozoa 126, 129
Hyolithes 126, 129, 189, 191, 195, 198, 199
——? 195
acadica **198**
(Camarotheca) emmonsi 199
carbonaria **198**
danianus **198**
micmac **198**
primordialus 126, 129, 189
shaleri **199**
vanuxemi **191**
Hyridella 105

I.

Idonearca 98, 134, 263, 267, 270
antrosa 267
compressirostra **270**
mediana **270**
shumardi 263
tippana 267
vulgaris 267
Igoceras 40
Illænurus 191

Page.

Illænurus eurekensis **191**
Illænus 36, 55, 80, 91, 186
(Bumastus) graftonensis **65**, 91
insignis 86
crassicauda 55
indeterminatus **186**
milleri **186**
taurus 55
trentonensis? 248
Incertæ sedes 261
Inoceramus 29, 30, 93, 95, 97, 111, 127, 133, 136, 143, 207, 208, 209, 218, 245, 253, 263, 267
——? 92, 231
(Actinoceramus) costellatus ... 47
altus **70**, 263
aratus **208**
aviculoides **21**
balchii **21**
barabini 92, 134, 263, 267, 274
(Catillus) balchii 97
convexus 97
cripsii ?, var. subcompressus 97
barabini 97
incurvatus 97
proximus 97
?, var. subcircularis 97
sagensis, var. nebrascensis 97
sublævis 97
tenuilineatus 97
tenuirostris 97
undabundus 97
vanuxemi 97
conradi **13**
confertim-annulatus 218, 253, 255
convexus **13**
crassalatus **133**
cripsii 218, 274
? 245
var. subundatus 92
cuneatus **21**
deformis 111, 134
depressus **134**
dimidius **127**, 134
elevatus **209**
erectus **111**
exogyroides **29**
flaccidus **134**
fragilis **13**, 93, 133, 263, 274
gilberti **136**, 143
howelli **136**, 143
(Inoceramus) altus 97
fragilis 97
incurvus **16**
lerouxi **243**
lynchii **207**
(Mytiloides) problematicus ... 97
var. aviculoides 98
mytilopsis **218**
nebrascensis **250**
? obliqua **30**
oblongus 143

Page.

Inoceramus perovalis 267
perplexus 260, 263
pertenuis 16
problematicus 95, 111, 133, 245, 273
problematicus? 263
pro-obliquus 267
pseudo-mytiloides 253
rectangulus 30
sagensis 250, 263, 267, 274
var. quadrans 267
simpsoni 22, 95, 111, 263
subcompressus 21
sublævis 13, 263
subundatus 27
sulcatus 47
syriacus 209
tenuilineatus 13, 263, 274
tenuirostriatus 29
texanus 218
umbonatus 18
undabundus 29
vancouverensis 256
vanuxemi 21, 263
ventricosus 15
(Volviceramus) exogyroides 97
umbonatus 97
Inoperculata 34
Insecta 37, 47
Integripalliata 266, 268
Integropallia 263
Iocrinus 188
trentonensis 188
Iphidea (?) sculptilis 76
Iridea 105
Isocardia 205, 207, 270
conradi 270
crenulata 207
fraterna 50
? hodgei 68
markoi 50, 205
washita 243
Isocardiidæ 270
Isochilina 188
Isodera 107
Isognomon 29, 32
Isorena 39, 159
depressa 59
humilis 67
Isopleurus curviliratus 48
meekianus 48
Isopoda 36, 46, 61, 179

J.

Jamira 209, 215, 216
affinis 49
bella 49, 215, 216
syriaca 209
Jeanpaulia radiata 246

K.

Kutorgina 189, 234
minutissima 234
prospectensis 189
sculptilis 189
whitfieldi 189

L.

Page.

Lacinia 219
Lacunaria alabamiensis 221
erecta 221
Lamellibranchiata 20, 26, 27, 28, 29, 30, 32, 33, 38, 40, 41, 42, 43, 44, 54, 55, 56, 58, 59, 61, 64, 66, 68, 73, 79, 80, 84, 86, 89, 90, 91, 92, 93, 94, 95, 97, 105, 108, 110, 112, 148, 149, 190, 194, 196, 235, 236, 260, 262, 263, 271
Lamellopora 247
infundibularia 247
Lamna texana 246
Lamprodoma elongata 222
phillipsii 222
Lampsilis 105
Lapparia mooreana 221
Latia dallii 166, 170
Latiarca 98
ononcheila 220
transversa 220
Latirus (Persisternia) plicatus 221
Lecia 61, 179
tricarinata 61, 179
Lecythiocrinus 150, 163
olliculæformis 150, 163
Leda 24, 26, 28, 116
barrisii 116
belliatriata 51
bisulcata 28, 47
compsa 220
curta 26
fibrosa 48, 256
longifrons 47
(Nucula) subscitula 19
oregona 49, 220, 256
pinnæformis 47
protexta 47
slackiana 47
subangulata 47
subscitula 20
willamettensis 49, 256
Yoldia) leviatriata 24
Legumen 270
appressum 270
planulatum 270
Leiopistha 127, 134, 264, 268
(Cymella) meeki 264
undata 101, 134
elegantula 268
inflata 268
protexta 268
(Psilomya) meekii 127, 134
Leioplax 138
urricula 138
Leiopteria 194
rafinesquii 194
Leiorhynchus 109, 193
quadricostatus 109
Lepacrinites 77
moorei 77
Leperditia 80, 126, 129, 188, 191, 195
alta 80
bivia 126, 129, 191

Page.

Leperditia (Isochilina) armeta 188
rotundata 195
Lepidesthes 60, 144, 154. 165
colletti 144, 154, 165
Lepidesthes coroyi 60
Lepidocentrus 63
irregularis 63
Lepidoptera 37, 47
Lepocrinites moorei 66
Leptæna 57, 78, 130, 189, 234
melita 189, 234
? nucleata 57
sericea 78, 130
trilobata 250
Leptesthes 99, 105, 141, 160
Leptocælia 57
flabellites 57
Leptocardia 99, 100, 236
cardiloidea 236
typica 236
Leptodesma 194, 196
—— ? 196
transversa 194
Leptodomus granosus 20
Leptolimnea 106, 153
Leptopora 147, 163
winchelli 147, 163
Leptosolen 101, 270
conradi 70, 101
Leucochella 159
Lichas 39, 55, 91
boltoni 91
cucullus 39, 55
Lichenocrinus 66, 69, 77
crateriformis 78
dyeri 77
Lima 30, 73, 86, 110, 133, 178, 218, 236
acutilineata 47
? cuneata 30
denticulata 47
leonensis 218
(Limatula) erecta 110
pelagica 47
(Plagiostoma) occidentalis 236
recticostata 30
retifera 52, 73, 86, 178
? sinuata 30
squamosa 47
wacoensis 133, 218
Limidæ 30, 110, 133
Limnæa 105, 107, 112, 153, 161
(Acella) haldemani 168
? compactilis 169
(Leptolimnea) minuscula 153
(Limnophysa ?) compactilis 77
nitidula 112, 168
vetusta 112
meekiana 107
meekii 170
miniuscula 170
nitidula 95, 161, 221
(Pleurolimnæa) tenuicostata 106, 161, 169, 221
(Polyrhytis) kingii 112, 170
shumardi 107, 170

Page.

Limnæa (Polyrhytis) similis 93, 95, 112, 170
tenuicosta 16, 221
vetusta 93, 95, 170
Limnæidæ 34, 105, 107, 112, 135
Limnæinæ 34
Limnophila 34
Limnophysa 106
Limopsis 98
ellipsis 220
nitens 50
parvula 98
pectuncularis 220
striato-punctatus 255
Limoptera 194
sarmenticia 194
Linearia 100, 269
cancellata-sculpta 48
contracta 269
? formosa 100
irradians 48
metastriata 269
Lingula 28, 33, 55, 58, 62, 72, 85, 89, 96, 119, 128, 129, 133, 177, 189, 192, 198, 262
alba-pinensis 192
ampla 250
antiqua 231
brevirostris 18, 33, 262
? dawsoni 198
halli 119
lowensis 247
læna 192
ligea 192
var. nevadensis 192
(Lingulella) membranacea 89
lonensis 192
? manticula 126, 129, 189
melie 89
minuta 62
mytiloides 85
nitida 28, 96
ovata 223, 225
pinnaformis 250
prima 231
quadrata 55
scotica 89
var. nebrascensis 72
subspatulata 13, 53
umbonata 177
whitei 192
Lingulella davisii 68
lamborni 68
Lingulepis 31, 189, 233, 234, 261
cuneolus 260, 261
dakotensis 261
ella 234
mæra 189, 233
? minuta 189, 234
perattenuatus 260, 261
pinnaformis 261
pinniformis 31, 68
prima 31
primæformis 259
Lingulidæ 31, 33, 62, 96, 133, 261, 262
Linnarssonia 199
sagittatis 199

Page.

Entalis paupercula ... 101
Entolium ... 35, 73, 86, 89, 178
aviculatum ... 73, 86
shumardianum ... 89
Ensis curtus ... 50
Entomostraca ... 36, 46, 61, 79, 89
Eocidaris ... 72, 83
hallianus ... 52, 72
squamosa ... 63
? squamosus ... 83
Eocystites ... 198
primævus ... 198
Eoscorpius ... 53, 61
carbonarius ... 61
Ephithemia ... 203
Eretmocrinus ... 41, 54
Eridophyllum ... 155
strictum ... 155
Eriphyla ... 99
gregaria ... 99
Erisocrinus ... 35, 36, 37, 45, 63, 72, 82, 85, 150, 163
antiquus ... 63, 82
(Cericrinus) planus ... 163
inflexus ... 163
conoideus ... 37, 45
nebrascensis ... 35, 36
planus ... 150
tuberculatus ... 37, 45
typus ... 35, 36, 45, 72, 85, 163
whitei ... 82, 63
tubulata ... 222
Eschara concentrica ... 273
tuberculata ... 273
Ethmophyllum ... 53
whitneyi ... 53
gracilis ... 53
Etonia ... 57
peculiaris ... 57
Eudiscoceras ... 110, 239
gabbi ... 110
Eucalyptocrinus ... 148
crassus ... 148
Eucheilodon ... 237
creno-carinata ... 237
Euconactæon ... 29
Eulina ... 25
aciculata ... 221
chrysalis ... 77
funicula ... 77
? inconspicua ... 77
lugubris ... 221
notata ... 221
peracuta ... 25, 27
scale ... 221
? subfusiformis ... 255
Eulimella ... 134, 144, 158
funicula ... 134, 144
? chrysallis ... 158
? inconspicua ... 158
Eumicrotis ... 29, 32, 33, 45, 178, 236
curta ... 32, 33, 49, 236
hawni ... 32, 178
var. ovata ... 32
sinuata ... 45
Eunema ... 25

Page.

Eunema ? salteri ... 25
Eunotia amphioxys ... 229
argus ... 229
gibba ... 203, 229
gibberula ... 229
granulata ... 229
librile ... 203, 229
subulata ... 229
textricula ... 229
uncinata ... 229
webstermanni ... 229
zebra ... 229
zebrina ... 229
Euomphalidæ ... 132
Euomphalus ... 25, 30, 80, 117, 118, 130, 132, 138, 165, 179, 195, 197, 235, 248
ammon ... 117
decewi ... 80
eurekensis ... 195
laxus ... 130, 235
michleranus ... 233
(Omphalotrochus) whitneyi ... 30
(Phanerotinus) laxus ... 195
planodorsatus ... 25
pernodosus ... 132
(Raphistoma ?) rotuliformis ... 65
trochiscus ... 65
roberti ... 118
rugosus ... 51, 87, 179
springvalensis ... 138, 165
(Straparollus) ophirensis ... 235
subrugosus ... 197
utahensis ... 235
subplanus ... 232
umbilicatus ... 25
Eupachycrinus ... 72, 84, 85, 136, 163
boydii ... 64, 85
fayettensis ... 85
platybasis ... 136, 163
tuberculatus ... 85
verrucosus ... 72
Euphoberia ... 53, 61
armigera ... 53, 61
major ... 53
?? ... 61
Euproops ... 61, 179
danæ ... 61, 179
colletti ... 179
Euptycha ... 29
Eurydesma ... 225
cordata ? ... 224, 225
elliptica ... 224, 225
gibbosa ... 225
globosa ... 224
sacculus ... 225
Eurypteridæ ... 61, 187
Eurypterus ... 61, 179
(Anthraconectes) masonensis ... 53, 61, 179
Euspira ... 143, 158
coalvillensis ...
utahensis ...
Eutomoceras ... 1
laubei ...
Eutropia halcana ...

Page.

Fusus cooperi 221, 222
conybearii 222
constrictus **13**
contortus **14**
corpulentus **206**
culbertsoni **14**
dakotaensis **14**, 49
ellerii **209**
† flexuocostatus **14**, 49
galpinianus **14**
geniculus **206**
haleanus 49
haydeni **256**
intertextus **18**, 49
mullicaensis 49
migrans 50
newberryi **14**, 49
nebrascensis **256**
(Neptunea ?) gabbi **76**, 144
utahensis **76**
oregonensis 50
(Pleurotoma ?) scarboroughi **18**
remondii 221
scarboroughi 49
† (Serrifusus) dakotensis 103
shumardi 264
(Strepsidura) marnochi **237**
subturritus **17**
subturrites 49
taitii 222
tenuilineata **13**
tenuilineatus 49
† utahensis 159
vaughani **17**, 49
† vinculum 49

G.

Gadus pusillus 221
subcarotatus 221
Gafrarium liratum 220
Galaxias 106
Galeodea (Galeodaria) quinquecostata 222
Galerites oregonensis **227**
Galeropsis excentricus 221
Galerus excentricus 221
Gallionella **203**
crenaria 229
distans ? 203, 229
granulata 229
lævis 229
punctata 229
undulata 229
varians 203
Gampsonyx 53
fimbriatus 61
Gasteropoda 20, 21, 22, 24, 26, 28, 30, 31, 32, 34, 39, 40, 42, 43, 44, 45, 56, 57, 59, 60, 63, 65, 67, 68, 74, 79, 80, 84, 86, 89, 90, 91, 93, 94, 95, 101, 105, 107, 108, 111, 112, 117, 118, 121, 126, 127, 129, 130, 132, 133, 134, 135, 136, 137, 138, 143, 147, 148, 151, 153, 154, 155, 158, 159, 161, 164, 165, 178, 191, 194, 197, 226, 232, 234, 235, 236, 250, 256, 258, 261, 264, 273
Gastrochæna 270

Page.

Gastrochæna americana 270
Gastrochænidæ 260, 263, 270
Gastrocœli 35
Gastrosiphites 35
Genota 103
Geophila 135
Gervillia 28, 98, 119, 151, 158, 164, 259, 262
(Avicula) sulcata 51
gregaria 159
longa 51
montanaensis 164
mudgeana **151**, 158
parva 51
recta **28**, 98, 262
sparsalirata **259**
strigosa **119**
subtortuosa **16**, 98
Gervilliopsis **267**
ensiformis 267
minima **267**
Gilbertsocrinus 42, 63, 82
bursa 42
calcaratus 42
(Goniasteroidocrinus) fiscellus 42
(Goniasteroidocrinus) ovatus **63**, 82
(Goniasteroidocrinus) tenuiradiatus **63**, 82
Glæonema paradoxum 229
Glauconome 72, 127, 131
nereidis **127**, 131
trilineata **72**
Globiconcha [?] elevata **255**
(Tylostoma) tumida **255**
Glossidæ 99, 134
Glossopteris ampia **226**
browniana 226
† cordata **226**
elongata **226**
linearis 226
phillipsii **231**
reticulum **226**
Glossus fraterna 50
markoei 50
Glycimeris 101, 143, 217
berthoudi **143**
estrellanus 50, **217**
occidentalis 101
Glyptocrinus 77, 187
argutus **187**
baeri **69**, 77
decadactylus 77
dyeri **68**, 77
var. subglobosus 68, 77
nealli 77
parvus 77
† subnodosus **187**
Gnathodon 266
† tenuidens **266**
Gnathostomata ....
Gomphoceras ....
(Apioceras) turbiniforme ..
sacculum ..
suboviforme ..

Page.

Modiomorpha 110, 194, 197
altiforme **194**
ambigua **197**
? desiderata **197**
? lata **110**
oblonga **194**
obtusa 194
? ovata **110**
? pintoensis **197**
Mollusca 24, 31, 32, 33, 38, 40, 41, 43, 44, 45, 54, 55, 56, 57, 58, 59, 60, 61, 68, 72, 78, 80, 84, 85, 88, 90, 91, 94, 95, 96, 105, 107, 108, 109, 110, 111, 112, 118, 120, 133, 135, 136, 137, 138, 142, 144, 148, 151, 153, 154, 155, 176, 225, 255, 260
vera 132, 133, 164
Molluscoidæ 133, 165, 260
Monoceras sulcatum 222
Monomyaria 97, 105, 132, **133, 263, 266**
Monopleura 176
marcida **176**
pinguiscula **176**
Monopteria **41,** 45, 127, 132, 178
gibbosa 178
marian **127,** 132
Monotis 86, 258
—— ? 258
? gregaria **64,** 86
hawni **19,** 20, 51
speluncaria 258
Monticulipora 129, 135, 155
dalii 129
frondosa 155
monticula **138**
Mortonia (Periarchus) crustuloides 222
lyelli 220
pileus-sinensis 222
tumida 222
Mortoniceras **104**
shoshonense 104
? vermilionense 104
Mulinia 215, 216
densata **215,** 216
Multicostatæ 34
Murchisonia 55, 74, 117, 147, 151, 164, 191
bicincta 55
copei **151**
inornata **40,** 87
major **232**
milleri 191
nebrascensis 74
obsolete **67**
? prolixa **117**
subtæniata 51
terebra **147,** 164
Muricidæ 103
Mya 215, 216
abrupta **205**
montereyana **215,** 216
? subsinuata **216**
tellinoides **231**
Myacites 31, 34, 111, 164
depressus **31**
inconspicuus **111**
nebrascensis **21,** 34
(Pleuromya) subcompressa 111, 179

Page.

Myacites (Pleuromya) weberensis **111**
subcompressus 164
subellipticus 34
Myacites unionoides 49
Myalina 24, 32, 44, 45, 72, 82, 86, 132, 151, 178, 196, 236, 257, 259
—— ? 132
angulata **24,** 32, 44
apachesi **242**
aviculoides 21, 32, 236
concentrica **24,** 44
congeneris **196**
? (Gervillia) perplana **259**
meliniformis **41,** 45
(Mytelus) perattenuata **19,** 20
nemesis **196**
nessus **196**
perattenuata 32, 51, 86
permiana 33, 151, 236
recta 258
recurvirostra **24,** 45
recurvirostris 178
squamosa 20, 258
st. ludovica 86
subquadrata 20, 32, 51, 73, 178, 274
swallovi 45, 51, 73, 132, 178
Myrophoria 111, 133
ambilineata **133**
lineata 111
Myomia **224**
elongata **224**
valida **224**
Myriapoda 37, 44, 61
Myrtea 99
Mytelus subarcuatus **16**
Mytilarca 194
chemungensis 194
dubia **194**
(Plethomytilus) oviformis 194
Mytilidæ 30, 33, 98, 110, 111, 260, 262, 267, 270
Mytiloides 97
Mytilus 30, 98, 116, 164, 211, 213, 217, 260, 262, 267
attenuatus **15**
concavus ? 51
engelmanni **274**
febristriatus **116**
humerus **211,** 213
inezensis **217**
inflatus 50
meekii **256**
multistriatus **30**
occidentalis **116**
oblivius **267**
(Orthonota) ventricosa **116**
pedroanus **211,** 213
pertenuis 18
subarcuatus 9
whitei 164, **260,** 262

N.

Naïa 135
Naiadites carbonaria 16
elongata 16
lævis 16
Naidea 16

Page.

Narica 212, 214
diegoana 50, **212**, 214, 221
Nassa 212, 214
intastriata 212
interstriata 214
pedroana **212**, 214
Natica 208, 210, 211, 212, 213, 214, 217, 219, 223, 226, 236
acutispira 48
alabamiensis 221
alveata **211**, 213, 221
ambigua **14**, 48
collina **219**
concinna **13**
erecta 221
geniculata **212**, 214
gibbosa 211, 213, 221
inezana 50, 217
indurata **208**
? lelia **236**
limula 219
minima 221
morganensis **14**
obliquata **13**
occidentalis **14**, 221
ocoyana **212**, 214
ostites ? 211, 213
orientalis **210**
paludinaeformis **12**
saxea **206**
? scalaris **210**
subcrassa **15**
syriaca **208**
texana **219**
tuomeyana **16**, 48
Naticidæ 102, 111, 132, 204
Naticina obliqua 221
Naticopsis 25, 27, 46, 80, 88, 132, 136, 152, 164, 165, 179
aequistriata **80**
altonensis 88, 152
hollidayi **25**
? (Idonearca) humilis **80**
levis **67**, 80
littonana var. genevievensis 44
mamillifera 152 **165**
nana 46, 132 179
nodosa **25**
(Platyostoma) aequistriata **67**
rumex **136**, 164
subovatus 88
(Trachydomia) nodosa 46
var. hollidayi 46
ventricosa 88
wheeleri 88 179
var. 152
Nautilidæ 32, 62, 164, 172, 182, 206
Nautilina 146
Nautilus 25, 27, 29, 32, 39, 42, 43, 44, 62, 74, 84, 92, 96, 144, 132, 144, 146, 179, 206, 220, 222
——? 222
angustatus 34, **206**
campbelli **97**, 98
clausicostatus **25**, 42

Page.

Nautilus (Cryptoceras) capax **39**, 92
? leidyi **39**
rockfordensis **40**
springeri **121**
danvillensis **144**, 165
dekayi 104
var. montanaensis 104, 205
digonus 42
(Discites) discoformis **39**, 84
ornatus var. amplus 39
(Discus) digonus **25**
planorbiformis **25**
sangamonensis **25**
trisulcatus **25**
divisus 121
elegans 104
var. nebrascensis 29
(Endolobus) peramplus **39**
spectabilis 45
eccentricus **19**, 20, 23
forbesianus 179
globatus 45
lamarckii 222
lasallensis **39**, 87
missouriensis 179
occidentalis 74
planorbiformis 46
ponderosus 74
sangamonensis 46
(Solenochellus) collectus **65**, 84
leidyi 84
spectabilis **25**
subglobosus **25**
(Temnochellus) cozzensi 84
latus 87
nicholasi **39**, 84
winslowi 87
(Temnochilus) cozzensi **65**
latus **65**
winslowi **65**
transplanatus **227**
(Tremotodiscus) calcaratus 40
trisulcatus 42
winslowi 179
Naticula bacillus 229
scalprum 229
semen 229
silicula 229
signa 229
Neera 101, 200, 202, 204, 272
aequivalvis **272**
flexa 42
longiventer **200**, 202
marylandica 101, 204
ventricosa 101
Nerita 215, 216, 206
occidentalis **215**, 218
quinquecincta 206
texana 218
Neritoma 40
Neritopsis 206
crassa 207
Neritopsidæ 39
Neritopsis 39, 207
magnifica 207

Page.

Nemodon brevifrons ... 267
cufaulensis ... 267
sulcatinus ... 98
Nemophora floridana ... 220
Neptuna impressa ... 49
Neptunella ... 103
Nerinea ... 208, 209, 210, 219
—— ? ... 210
abbreviata ... **210**
cochleæformis ... **210**
cretacea ... **209**
orientalis ... **210**
rhamdunensis ... **208**
schottii ... **219**
syriaca ... **208**, 210
Nerita ... 180
—— ? ... 180
(Neresis) densata ... 48
Neritella ... 28, 34
nebrascensis **28**, 34, 49
(Neresis) densata ... 48
Neritidæ ... 34, 133, 134, 180
Neritina ... 127, 133, 134, 136, 137, 141, 143, 158, 161, 166
bannisteri ... 158, 167
bruneri ... **166**, 169
(Dostia?) bellatula ... **76**
carditoides ... **76**
(patelliformis) ... **76**
incompta ... 143
naticiformis ... **141**, 161, 168
nebrascensis ... 49, 167
(Neritella) bannisteri ... **76**
pisum ... **76**
phaseolaris ... **127**, 133
pisiformis ... **76**, 158
pisum ... 143
powelli ... **136**
(Velatella) baptista ... **141**, 161, 169
bellatula ... 158, 167
carditoides ... 134, 158, 167
patelliformis ... 143
var. webe-rensis ... 143
volvilineata ... **137**, 161, 169
Neritopsis? tuomeyana ... 48
Neuropteris ... 149, 246
angulata ... **246**
hirsuta ... 149
rarinervis ... 149
Neverita gibbosa ... 221
Nipterocrinus ... **54**, 82
arboreus ... 82
wachsmuthi ... **54**, 82
Nodosaria ... 219
texana ... **219**
Nœggerathia ... **226**
elongata ... 226
media ... **226**
spatulata ... **226**
Notocœli ... 35
Notomya ... 224
Notosiphites ... 35
Nucleospira ... 193
barriali ... **116**
concinni ... 193

Page.

Nucula ... 73, 86, 93, 98, 116, 147, 155, 163, 178, 194, 197, 207, 208, 209, 213, 224, 247, 263, 267, 271
—— ? ... 194
abrupta, Conrad ... **209**
Dana ... **224**, 225
(Acila) conradi ... 50
anodontoides ... **69**
bellastriata ... 159
beyrichi ... 51, 73, 86
cancellata ... **15**, 98
circe ... **271**
concinna ... **225**
crebrilineata ... **208**
cultelliformis ... 220
decisa ... 213
divaricata ... 50, **206**
equilateralis ... **15**
evansi ... **15**
gabbana ... **267**
glendonensis ... **225**
haydeni ... 159
impressa ... **206**, 231
insularis ... **197**
iowensis ... **116**
kazanensis ... 51
levatiforme ... **197**
longifrons ... 267
magna ... 220
media ... 220
minuta ... 247
monmouthensis ... **267**
myiformis ... **267**
obsoletastriata ... **16**, 98
? obtenta ... **209**
ovula ... 220
paralella ... **207**
parva ... 86, 220
pectuncularis ... 220
penita ... 49
percrassa ... 267
perdita ... **208**
perequalis ... 267
perobliqua ... **207**
perovata ... **208**
perumbonata ... 147, 163
plana ... 220
planimarginata ... 98, 263
planomarginata ... **15**
plicata ... 220
pulcherrima ... 220
rescuensis ... **194**
scitula ... **15**
semen ... 220
slackiana ... 267
submucronata ... **207**
subnasuta ... **13**
subplana ... **15**, 98
syriaca ... **207**
traskana ... **17**, 98
ventricosa ... **13**, 73, 155, 178
Nuculana ... 44, 73, 87, 98, 140, 147, 160, 163, 178, 211, 260, 263, 267, 271
albaria ... 271
bellistriata ... 178
var. attenuata ... 73

Page.

Nuculana bisulcata....47, 98, 263
compressifrons....268
compsa....220
cultelliformis....220
†curta....44
decisa....**211**
†equilateralis....98
inclara....**140**, 160
longifrons....47
magna....220
media....220
obesa....**147**, 163
oregona....49, 220
ovula....220
parva....220
penita....49
pinnæformis....47, 268
plana....220
plicata....220
protexta....47, 267
pulcherrima....220
semen....220
slackiana....47
subangulata....47
subequilatera....**260**, 263
subnasuta....98
willamettensis....49
Nuculanidæ....32, 260
Nuculaninæ....32, 33
Nucularia....268, 271
papyria....268
secunda....**271**
Nuculidæ....98, 267, 271
Nuculites....235
triangulus....**235**
Nullipora† obtexta....**119**
Nummulites....209
arbiensis....**209**
floridana....220
mantelli....222
Nyassa....194
parva....**194**

O.

Obeliscus melanellus....221
pygmæus....221
striatus....221
Obolella....27, 31, 189, 190, 198, 233, 261
——†....198
†ambigua....**190**
chromatica....199
discoidea....189, **233**
nana....**27**, 31, 261
polita....261
transversa....198
Obolidæ....261
Obolus....56, 259, 261
pectenoides....**259**
†pectenoides....261
(Trimerella) conradi....56
Obovaria....105
†Odontobasis....**103**, 137, 141, 162
buccinoides....**137**
buccinoides....162
constricta....103

Page.

†Odontobasis formosa....**141**, 162
Odontocephalus....58
Odontopteris....149
subcuneata....149
Ogygia....190, 234
parabola....**234**
†problematia....**190**
producta....**234**
†spinosa....**190**
Olenellus....126, 129, 189
gilberti....126, 129, 189
howelli....129, 189
iddingsi....**189**
powelli....126
Olenus (Olenellus) gilberti....**88**
howelli....**88**
Oligoporus....**25**, 43, 54, 83
coreyi....**64**
danæ....43, 60
nobilus....**54**, 83
Oligoptych....101
Oliva ancillariæformis....50
phillipsii....222
Olivella ancillariformis....50
Olivula† plicata....222
punctulifera....222
Ollacrinus....42
Omala....100
Omphiscola....106
Onychaster....**61**, 63, 83
barrisi....83
flexilis....**61**
flexilus....83
Onychocrinus....40, 43, 60, 84, 154
diversus....**40**, 60
exculptus....83, 154
monroensis....43
norwoodi....43
ramulosus....154
whitfieldi....84
Operculatum planulatum....222
Omphalotrochus....30
Ophileta....55, 108
complanata var. nana....108
owenana....**55**
Ophioderma....158
†bridgeremais....158
Ophiuroidea....78
Opis....**208**, 209
equalis....**209**
undatus....**208**
Orbicula....207, 208, 210
†——....210
lugubris....49
multilineata....49
prima....**250**
subobliqua....**207**
†syriaca....**209**
Orbiculoidea....72, 89
——†....72
Orbitolites discoidea....230
interstitia....220
(Orbitoides) mantelli....232
Orbitulites† reticulata....**247**, 248
texanus....47

Page.

Himantidium arcus 229
Hinnites 216
crassa **216**
crassis 49
giganteus 49
Hipponyx borealis 21
pygmæa 221
Hippurites 209, 210
liratus **210**
plicatus **210**
syriacus **209**
Holaster 206
comanchesi **243**
simplex **255**
syriacus **206**
Holectypus planatus **233**, 255
Holopea 39
(Cyclora) nana **67**
(Isonema) depressa **39**
Holostomata 264
Homala 100
Homalina 100
Homocrinus 91
angustatus **64**, 91
Hormomya 98
Huronia annulata **232**
vertebralis 232
Hyalina 106, 161
? evansi 106, 161, 169
? occidentalis 106, 161, 169
Hybocrinus 55
? incurvus 55
Hydreinocrinus 121
verrucosus **121**
Hydrobia 106, 137, 162
anthonii 221
anthonyi 106, 162, 170
? eulimoides 107, 162, 170
recta **137**, 170
subconica 107, 162, 170
utahensis **137**, 169
warrenana 106, 162, 170
Hydrozoa 126, 129
Hyolithes 126, 129, 189, 191, 195, 198, 199
—— ? 195
acadica **198**
(Camarotheca) emmonsi 199
carbonaria **198**
danianus **198**
micmac **198**
primordialus 126, 129, 189
shaleri **199**
vanuxemi **191**
Hyridella 105

I.

Idonearca 98, 134, 263, 267, 270
antrosa 267
compressirostra **270**
medians **270**
shumardi 263
tippana 267
vulgaris 267
Igoceras 40
Illænurus 191

Page.

Illænurus eurekensis **191**
Illænus 36, 55, 80, 91, 186
(Bumastus) graftonensis **65**, 91
insignis 80
crassicauda 55
indeterminatus **186**
milleri **186**
taurus 55
trentonensis ? 248
Incertæ sedes 261
Inoceramus 29, 30, 93, 95, 97, 111, 127, 133, 136, 143, 207, 208, 209, 218, 245, 253, 263, 267
—— ? 92, 231
(Actinoceramus) costellatus ... 47
altus **70**, 263
aratus **208**
aviculoides **91**
balchii **91**
barabini 92, 134, 263, 267, 274
(Catillus) balchii 97
convexus 97
cripsii ?, var. subcompressus 97
barabini 97
incurvatus 97
proximus 97
?, var. subcircularis 97
sagensis, var. nebrascensis 97
sublævis 97
tenuilineatus 97
tenuirostris 97
undabundus 97
vanuxemi 97
conradi **13**
confertim-annulatus 218, 253, 255
convexus **13**
crassalatus **133**
cripsii 218, 274
?..... 245
var. subundatus 92
cuneatus **91**
deformis 111, 134
depressus **134**
dimidius **127**, 134
elevatus **209**
erectus **111**
exogyroides **29**
flaccidus **134**
fragilis **13**, 93, 133, 263, 274
gilberti **136**, 143
howelli **136**, 143
(Inoceramus) altus 97
fragilis 97
incurvus **16**
lerouxi **243**
lynchii **207**
(Mytiloides) problematicus ... 97
var. aviculoides 98
mytilopsis **218**
nebrascensis **250**
? obliqua **30**
oblongus 143

Page.

Inoceramus perovalis 267
perplexus 260, 263
pertenuis 16
problematicus. .95, 111, 133, 245, 273
problematicus? 263
pro-obliquus 267
pseudo-mytiloides 253
rectangulus 30
sagensis. 250, 263, 267, 274
var. quadrans 267
simpsoni. 22, 95, 111, 263
subcompressus 21
sublævis 13, 263
subundatus 27
sulcatus 47
syriacus 209
tenuilineatus 13, 263, 274
tenuirostriatus 29
texanus 218
umbonatus 18
undabundus 29
vancouverensis 256
vanuxemi 21, 263
ventricosus 15
(Volviceramus) exogyroides .. 97
umbonatus 97
Inoperculata 34
Insecta 37, 47
Integripalliata 266, 268
Integropallia 263
Iocrinus 188
trentonensis 188
Iphidea (?) sculptilis 76
Iridea 105
Isocardia 205, 207, 270
conradi 270
crenulata 207
fraterna 50
? hodgei 68
markoi 50, 205
washita 243
Isocardiidæ 270
Isochilina 188
Isodora 107
Isognomen 29, 32
Isomena 39, 159
depressa 59
humilis 67
Isopleurus curviliratus 48
meekianus 48
Isopoda 36, 46, 61, 179

J.

Janira 209, 215, 216
affinis 49
bella 49, 215, 216
syriaca 209
Jeanpaulia radiata 246

K.

Kutorgina 189, 234
minutissima 234
prospectensis 189
sculptilis 189
whitfieldi 189

L.

Page.

Lacinia 219
Lacunaria alabamiensis 221
erecta 221
Lamellibranchiata 20, 26, 27, 28, 29, 30, 32, 33, 38, 40, 41, 42, 43, 44, 54, 55, 56, 58, 59, 61, 64, 66, 68, 73, 79, 80, 84, 86, 89, 90, 91, 92, 93, 94, 95, 97, 105, 108, 110, 112, 148, 140, 190, 194, 196, 235, 236, 260, 262, 263, 271
Lamellopora 247
infundibularia 247
Lamna texana 246
Lamprodoma elongata 222
phillipsii 222
Lampallis 105
Lapparia mooreana 221
Latia dallii 166, 170
Latiarca 98
ononcheila 220
transversa 220
Latirus (Persisternia) plicatus 221
Leaia 61, 179
tricarinata 61, 179
Lecythiocrinus 150, 163
olliculæformis 150, 163
Leda 24, 26, 28, 116
barrisii 116
bellistriata 51
bisulcata 28, 47
compsa 220
curta 26
fibrosa 48, 256
longifrons 47
(Nucula) subcitula 19
oregona 49, 220, 256
pinnæformis 47
protexta 47
slackiana 47
subangulata 47
subscitula 20
willamettensis 49, 256
(Yoldia) levistriata 24
Legumen 270
appressum 270
planulatum 270
Leiopistha 127, 134, 264, 268
(Cymella) meeki 264
undata 101, 134
elegantula 268
inflata 268
protexta 268
(Psilomya) meekii 127, 134
Leioplax 138
turricula 138
Leiopteria 194
rafinesquii 194
Leiorhynchus 109, 193
quadricostatus 109
Lepacrinites 77
moorei 77
Leperditia 80, 126, 129, 188, 191, 195
alta 80
bivia 126, 129, 191

Page.

Lepyrium (Lacuilina) armata 186
retundata 195
Leptodontus 60, 144, 154, 165
collisti 144, 154, 165
Leptodontus coruyi 60
Lepidocentrus 63
irregularis 63
Lepidoptera 37, 47
Lepyrinites moorei 66
Leptonia 57, 78, 130, 189, 234
melita 189, 234
? nucleata 57
sericea 78, 130
trilobata 230
Leptoxis 98, 165, 141, 160
Leptoxalia 57
flabellites 57
Leptoxardia 98, 160, 226
cardioides 226
typica 226
Leptodesma 184, 185
..... 185
..... 224
Leptodesma granatum 31
Leptolimnea 105, 155
Leptoxis 147, 155
..... 143, 155
Leptoxis 161, 170
..... 209, 161
Leptoxella 159
..... 30, 65, 91
..... 91
..... 209, 55
..... 66, 69, 77
..... teriformis 78
Jeffr. 77
..... 30, 73, 86, 110, 133, 176, 218, 236
..... 47
..... 30
..... 47
..... 218
..... erecta 110
..... 47
(Physostoma) occidentalis 236
..... costata 30
..... fera 52, 73, 86, 178
..... nuata 30
squamosa 47
..... ascoensis 133, 218
Limidæ 30, 110, 133
Limnæa 105, 107, 112, 153, 161
(Acella) haldemani 168
? compactilis 169
(Leptolimnea) minuscula 153
(Limnophysa ?) compactilis 77
nitidula 112, 168
vetusta 112
meekiana 107
meekii 170
miniuscula 170
nitidula 95, 161, 221
(Pleurolimnæa) tenuicostata 106, 161, 169, 221
(Polyrhytis) kingii 119, 170
shumardi 107, 170

Page.

Limnæa (Polyrhytis) similis 22, 95, 112, 1
tenuicosta 16, 2
vetusta 22, 95, 1
Limnæidæ 34, 105, 107, 112, 1
Limnæinæ ..... .
Limnophila ..... .
Limnophysa 1
Limopsis ..... .
ellipsis 2
nitens ..... .
parvula ..... .
pectuncularis 2
striato-punctatus 2
Limoptera 1
sarmenticia 1
Linearia 100, 2
cancellata-sculpta ..... .
contracta 2
? formosa 1
irradians ..... .
metastriata 2
Lingula 28, 33, 55, 58, 62, 72, 85, 89, 96, 119, 1
129, 133, 177, 189, 192, 198, 2
alta-pinensis 1
angla 2
antiqua 2
[illegible]borestris 18, 33, 2
[illegible]bowmani 1
[illegible]halli 1
[illegible]ensis 2
[illegible]ana 1
[illegible]ina 1
var. nevadensis 1
[illegible]arvula, membranacea ..... .
[illegible]ensis 1
[illegible]ensis 126, 129, 1
[illegible]nis ..... .
[illegible]ensis ..... .
[illegible]ntosa ..... .
nitida 28,
ovata 223, 2
pinnæformis 2
prima 2
quadrata ..... .
scotica ..... .
var. [illegible]ensis ..... .
subspatulata 13,
umbonata 1
white 1
Lingulella davisii ..... .
lamborni ..... .
Lingulepis 31, 189, 233, 234, 2
[illegible]ensis 260, 2
dakotensis 2
ella 2
[illegible]era 189, 2
? minuta 189, 2
perattenuatus 260, 2
pinnaformis 2
pinniformis 31,
prima ..... .
primæformis 2
Lingulidæ 31, 33, 62, 96, 133, 261, 2
Linnarssonia 1
sagittatis 1

Page.

Melania ? sculptilis 112, 166, 170
simpsoni 22, 221
sublaevis 17, 221
? subsculptilis 163, 166, 170
subtortuosa 17, 221
taylori 166, 170
tenuicarinata 17, 221
warrenana 17
wyomingensis 162, 169
Melanitidæ 112, 135
Melanopsis 166
Meleagrinella 267
abrupta 267
Melina montana 50
torta 50
Melinia nitidula 231
Melininæ 29, 32
Mellita texana 215
Melonites 23
dansi 23
multipora 43, 60, 212
Menetus 34, 106
Menocephalus 250
Meretrix 211, 212, 213, 214
californiana 211, 213
dariena 212, 214
decisa 50, 211, 213
tularana 211, 213
uniomeris 50, 211, 213
uvasana 211, 213
Merista 57
lævis 57
Meristella 56, 80, 193
Meristella ? (Meristina) cylindrica 80
(Whitfieldia) nasuta 193
Merocrinus 187
corroboratus 188
typus 187
Merostomata 61, 179
Mesalia 102
kansasensis 102
striata 221
Mesodesma 137
bishopi 137
Meconacis 199
Mesorhytis 103
Metaptera 105
Metis 100
Metoptoma 40, 60, 186, 188, 191, 195, 197
? analoga 191
billingsi 188
cornuta forme 186
? devonica 195
peroccidens 197
phillipsi 191
(Platyceras) umbella 40
? umbella 60
Michilinia 165, 177, 223, 235
—— ? 235
eugeneæ 177
expansa 165
placenta 165
Micrabacia 96
americana 96
Microcyclus 58

Page.

Microcyclus discus 58
Microdiscus 198
dawsoni 198
punctatus 198
Microdoma 40, 87
conica 40, 87
Microdon 194, 197
(Cypricardella) connatus 197
macrostriatus 194
Micromeris minutissima 220
parva 220
Micropurgus minutulus 221
Microstisia 96
millepunctata 96
Micropyrgus 107, 162
minutulus 107, 162, 169
Milthea 99
Mitra costata 221
flemingii 221
fusoides 221
lineata 221
minima 221
mooreana 221
Mnestia 101
Modiola 28, 73, 197, 211, 213, 267, 270
attenuata 47
(Brachydontes) multilinigera 76
burlingtonensis 267
concentrica-costellata 47
contracta 50, 211, 213
cretacea 47
ducatelli 50
granulato-cancellata 47
johnsoni 270
juliæ 47
julia 267
(Lithodomus ?) inflata 270
meekii 47
? nevadensis 197
ovata 270
pedernalis 47
(Perna) formosa 28, 49
pertenuis 49
saffordi 47
spiniger 50
? subelliptica 73
(Volsella) subimbricata 80
Modiolaria 98
Modiolopsis 38, 54, 56, 130, 187, 190
—— (?) 130
acutifrons 224
arcodes 224
cancellata 187
imbricata 224
modiolaris 232
modioliformis 54
occidens 191
orthonata 54
perovata 38, 56
pholadiformis 232
pogonipensis 191
prærupta 224
siliqua 29
simplex 2
subundata 24

Page.

Macrocheilus medialis 25,46
newberryi 86
pallianus 51
pulchellus 25
texanus 258
Macrocyclis 107
spatiosa 107, 170, 221
Macrodon 73, 86, 90, 117, 197
—— ? 85
delicatus 64
hamiltonæ 197
micronema 40
obsoletus 69, 90
parvus 117
tenuistriata 51, 73
tenuistriatus 41, 85
truncatus 197
Macrodontinæ 34
Macroscaphites 104
Macrura 37, 46, 61, 179
Mactra 93, 100, 111, 207, 211, 213, 215, 218, 259
—— ? 217
alta 16
arciformis 207
? canonensis 70, 143
(Cymbophora ?) formosa 100
gracilis 100
nitidula 100
? siouxensis 100
? utahensis 111
warrenana 100
diegoana 211, 213
emmonsi 111
formosa 16
gabiotensis 217
gibbsana 27, 93
gracilis 21
? holmesi 143
? incompta 134
maia 259
petrosa 207
pervetus 207
siouxensis 21
syriaca 207
texana 215, 218
(Trigonella) ? arenaria 111
warrenana 16
Mactridæ 100, 111, 134, 269, 271
Mæonia 225
axinia 225
? carinata 225
elliptica 225
elongata 225
fragilis 225
gigas 225
gracilis 225
grandis 225
myiformis 225
? recta 225
valida 225
Mæra 100
Malea 216
ringens 216
Malletinæ 32
Margarita 102, 264

Page.

Margarita abyssinus 48
mudgeana 102
nebrascensis 102, 264
Margaritana 98
nebrascensis 99, 167
Margaritella 102
abotti 48
flexistriata 102
Marginella biplicata 221
Marsupiocrinites 42
Martesia 101, 270
cuneata 101
(Pholas) cretacea 270
? rœsaleri 69
Martinia 30, 31, 41, 44, 63, 130, 131, 156, 198
Matthevia 199
variabilis 199
Masonia 61
woodiana 61
Meekella 72, 85, 120, 121, 131, 177
striato-costata 72, 85, 121, 131, 177
Meekoceras 146, 162, 239
aplanatum 146, 162, 239
gracilitatis 146, 162, 239
var 146, 163
mushbachanus 146
mushbachianum 162, 239
Megalaspis 126, 129
belemnurus 126
belemnura 129
Megambonia 79, 194
jamesi 68, 79
occidentalis 194
Megaptera 56, 148
casei 56
Megistocrinus 82, 118, 138, 251
crassus 118
evansii 251
farnsworthi 138
parvirostris 82
plenus 118
(Saccocrinus) whitei 82
Melampus 158
—— ? 158, 167
americana 166, 169
antiquus 77, 158, 167
? priscus 99
Melania 28, 112, 137, 162
anthonyi 16, 221
arcta 22, 221
claibornensis 170
convexa 16, 17
(Goniobasis ?) sculptilis 65
subsculptilis 65
? wyomingensis 77
humerosa 22, 221
? insculpta 162, 169
invenusta 17
larunda 137
minutula 16, 221
multistriata 16, 221
nebrascensis 16
? nitidula 99
omitta 17
(Potodoma) veterna 28, 40

Page.

Melania ? sculptilis 112, 166, 170
simpsoni 22, 221
sublaevis 17, 221
? subsculptilis 163, 166, 170
subtortuosa 17, 221
taylori 166, 170
tenuicarinata 17, 221
warrenana 17
wyomingensis 162, 169
Melanidæ 112, 135
Melanopsis 166
Meleagrinella 267
abrupta 267
Melina montana 50
torta 50
Melinia nitidula 221
Melininæ 29, 32
Mellita texana 215
Melonites 23
danæ 23
multipora 43, 60, 212
Menetus 34, 106
Menocephalus 250
Meretrix 211, 212, 213, 214
californiana 211, 213
dariena 212, 214
decisa 50, 211, 213
tularana 211, 213
uniomeris 50, 211, 213
uvasana 211, 213
Merista 57
lævis 57
Meristella 56, 80, 193
Meristella ? (Meristina) cylindrica 80
(Whitfieldia) nasuta 193
Merocrinus 187
corroboratus 188
typus 187
Merostomata 61, 179
Mesalia 102
kansasensis 102
striata 221
Mesodesma 137
bishopi 137
Mesomacis 199
Mesorhytis 103
Metaptera 105
Metis 100
Metoptoma 40, 60, 186, 188, 191, 195, 197
? analoga 191
billingsi 188
cornuta forme 186
? devonica 195
peroccidens 197
phillipsi 191
(Platyceras) umbella 40
? umbella 60
Michilinia 165, 177, 223, 235
—— ? 235
eugenese 177
expansa 165
placenta 165
Micrabacia 96
americana 96
Microcyclus 58

Page.

Microcyclus discus 58
Microdiscus 198
dawsoni 198
punctatus 198
Microdoma 40, 87
conica 40, 87
Microdon 194, 197
(Cypricardella) connatus 197
macrostriatus 194
Micromeris minutissima 220
parva 220
Micropurgus minutulus 221
Microstisia 96
millepunctata 96
Micropyrgus 107, 162
minutulus 107, 162, 169
Milthea 99
Mitra costata 221
flemingii 221
fusoides 221
lineata 221
minima 221
mooreana 221
Mnestia 101
Modiola 28, 73, 197, 211, 213, 267, 270
attenuata 47
(Brachydontes) multilinigera 76
burlingtonensis 267
concentrica-costellata 47
contracta 50, 211, 213
cretacea 47
ducatelli 50
granulato-cancellata 47
johnsoni 270
juliæ 47
julia 267
(Lithodomus ?) inflata 270
meekii 47
? nevadensis 197
ovata 270
pedernalis 47
(Perna) formosa 28, 49
pertenuis 49
saffordi 47
spiniger 50
? subelliptica 73
(Volsella) subimbricata 80
Modiolaria 98
Modiolopsis 38, 54, 58, 130, 187, 190
—— (?) 130
acutifrons 224
arcodes 224
cancellata 187
imbricata 224
modiolaris 232
modioliformis 54
occidens 191
orthonata 54
perovata 38, 58
pholadiformis 232
pogonipensis 191
prærupta 224
siliqua 224
simplex 224
subnasuta 64, 91

Page.

Nemodon brevifrons 267
eufaulensis 267
sulcatinus 98
Nemophora floridana 220
Neptuna impressa 49
Neptunella 103
Nerinea 208, 209, 210, 219
—— ? 210
abbreviata **210**
cochleæformis **210**
cretacea **209**
orientalis **210**
rhamdunensis **208**
schottii **219**
syriaca **208**, 210
Nerita 180
—— ? 180
(Nereis) densata 48
Neritella 28, 34
nebrascensis **28**, 34, 49
(Nereis) densata 48
Neritidæ 34, 133, 134, 180
Neritina ..127, 133, 134, 136, 137, 141, 143, 158, 161, 166
bannisteri 158, 167
bruneri **166**, 169
(Dostia?) bellatula **76**
carditoides **76**
(patelliformis) **76**
incompta 143
naticiformis **141**, 161, 168
nebrascensis 49, 167
(Neritella) bannisteri **76**
pisum **76**
phaseolaris **127**, 133
pisiformis **76**, 158
pisum 143
powelli **136**
(Velatella) baptista **141**, 161, 169
bellatula 158, 167
carditoides 134, 158, 167
patelliformis 143
var. webe-
rensis .. 143
volvilineata **137**, 161, 169
Neritopsis? tuomeyana 48
Neuropteris 149, 246
angulata **246**
hirsuta 149
rarinervis 149
Neverita gibbosa 221
Nipterocrinus **54**, 82
arboreus 82
wachsmuthi **54**, 82
Nodosaria 219
texana **219**
Nœggerathia **226**
elongata 226
media **226**
spatulata **226**
Notocœli 35
Notomya 224
Notosiphites 35
Nucleospira 193
barrisii **116**
concinni 193

Page.

Nucula ..73, 86, 92, 98, 116, 147, 155, 163, 178, 194, 197, 207, 208, 209, 213, 224, 247, 263, 267, 271
—— ? 194
abrupta, Conrad **209**
Dana **224**, 225
(Acila) conradi 50
? anodontoides **69**
bellastriata 159
beyrichi 51, 73, 86
cancellata **15**, 98
circe **271**
concinna **225**
crebrilineata **206**
cultelliformis 220
decisa 213
divaricata 50, **206**
equilateralis **15**
evansi **15**
gabbana **267**
glendonensis **225**
haydeni 159
impressa **206**, 221
insularis **197**
iowensis **116**
kazanensis 51
levatiforme **197**
longifrons 267
magna 220
media 220
minuta 247
monmouthensis **267**
myiformis **207**
obsoletastriata **16**, 98
? obtenta **209**
ovula 220
paralella **207**
parva 86, 220
pectuncularis 220
penita 49
percrassa 267
perdita **208**
perequalis 267
perobliqua **207**
perovata **208**
perumbonata 147, 163
plana 220
planimarginata 98, 263
planomarginata **15**
plicata 220
pulcherrima 220
rescuensis **194**
scitula **15**
semen 220
slackiana 267
submucronata **207**
subnasuta **13**
subplana **15**, 98
syriaca **207**
traskana **17**, 98
ventricosa **13**, 73, 155, 178
Nuculana 44, 73, 87, 98, 140, 147, 160, 163, 178, 211, 260, 263, 267, 271
albaria 271
bellistriata 178
var. attenuata 73

Page.

Nuculana bisulcata....47, 98, 263
compressifrons....268
compsa....220
cultelliformis....220
? curta....44
decisa....211
? equilateralis....98
inclara....140, 160
longifrons....47
magna....220
media....220
obesa....147, 163
oregona....49, 220
ovula....220
parva....220
penita....49
pinnæformis....47, 268
plana....220
plicata....220
protexta....47, 267
pulcherrima....220
semen....220
slackiana....47
subangulata....47
subequilatera....260, 263
subnasuta....98
willamettensis....49
Nuculanidæ....32, 260
Nuculaninæ....32, 33
Nucularia....268, 271
papyria....268
secunda....271
Nuculidæ....98, 267, 271
Nuculites....235
triangulus....235
Nullipora ? obtexta....119
Nummulites....209
arbiensis....209
floridana....220
mantelli....222
Nyassa....194
parva....194

O.

Obeliscus melanellus....221
pygmæus....221
striatus....221
Obolella....27, 31, 189, 190, 198, 233, 261
——?....198
? ambigua....190
chromatica....199
discoides....189, 233
nana....27, 31, 261
polita....261
transversa....198
Obolidæ....261
Obolus....56, 259, 261
pectenoides....259
? pectenoides....261
(Trimerella) conradi....56
Obovaria....105
? Odontobasis....103, 137, 141, 162
buccinoides....137
buccinoides....162
constricta....103

Page.

? Odontobasis formosa....141, 162
Odontocephalus....58
Odontopteris....149
subcuneata....149
Ogygia....190, 234
parabola....234
? problematia....190
producta....234
? spinosa....190
Olenellus....126, 129, 189
gilberti....126, 129, 189
howelli....129, 189
iddingsi....189
powelli....126
Olenus (Olenellus) gilberti....88
howelli....88
Oligoporus....25, 43, 54, 83
coreyi....64
danæ....43, 60
nobilus....54, 83
Oligoptych....101
Oliva ancillariæformis....50
phillipsii....222
Olivella ancillariformis....50
Olivula ? plicata....222
punctulifera....222
Ollacrinus....42
Omala....100
Omphiscola....106
Onychaster....61, 63, 83
barrisi....83
flexilis....61
flexilus....83
Onychocrinus....40, 43, 60, 84, 154
diversus....40, 60
exculptus....83, 154
monroensis....43
norwoodi....43
ramulosus....154
whitfieldi....84
Operculatum planulatum....222
Omphalotrochus....30
Ophileta....55, 108
complanata var. nana....108
owenana....55
Ophioderma....158
? bridgerensis....158
Ophiuroidea....78
Opis....208, 209
equalis....209
undatus....208
Orbicula....207, 208, 210
?——....210
lugubris....49
multilineata....49
prima....250
subobliqua....207
? syriaca....209
Orbiculoidea....72, 89
——?....72
Orbitolites discoidea....220
interstitia....220
(Orbitoides) mantelli....223
Orbitulites ? reticulata....247, 248
texanus....47

Page.

Orthis..... 29, 30, 57, 58, 62, 72, 78, 85, 109, 116, 129, 130, 131, 148, 151, 165, 177, 189, 190, 192, 198, 234, 235, 247, 248
——? 30, 58, 248
arachnoides 233
bellula 78
biforata var. acutilirata 148
lynx..... 130
billingsi..... 198
borealis 78
carbonaria 72, 85
coloradoensis..... 66
crenistria 243
cuneata 250
electra 129
ella..... 78
emacerata 78
eurekensis 189
fissicosta 78
hamburgensis 190
hibrida..... 57
impressa 192
insculpta..... 78
iowensis 62, 148
var. furnarius..... 58
lonensis 190
mcfarlanei 58, 62, 192
michelini..... 109
occidentalis.....78, 130, 148
pecosii 131, 177, 243
perveta 190
plicatella.....78, 130
(Platystrophia) acutilirata..... 78
biforata..... 78
dentata 78
laticosta 78
lynx 78
pogonipensis 234
resupinata? 235
resupinoides 151
retrorsa..... 78
subelliptica 116
subcarinata 57
subquadrata 78, 148
testudinaria .....130, 190, 248?
thiemei 116, 165
tricenaria 190
tulliensis..... 192
umbraculum? 232
Orthisina 257
——?..... 257
crassa.....19, 20
missouriana 52
missouriensis 20
shumardiana 20
umbraculum 20, 274
Orthoceras ..25, 27, 36, 39, 44, 55, 74, 79, 87, 91, 94, 109, 110, 126, 129, 154, 179, 187, 195, 198, 248
——?.....191, 198, 258
anellum 55
angulatum 91
annulato-costatum 44
annulatum 154
annulocostatum 27
baculum 22, 94

Page

Othoceras blakei..... 1
(Cameroceras) colon 1
colon 19
cribrosum.... 1
crebristriatum .39,
eurekensis ... 19
expansum ... .25, 27,
?isogramma . 6
jolietensis 39,
kingii... 10
marginale..... 24
medullare..... 1
multicameratum 1
nobile..... 3
nova mexicana 24
oneidaense 18
(Ormoceras) beckii..... 1
ortoni 68,
randolphensis 1
rushensis 87, 1
subbaculum..... 3
undulatum 24
winchellii 39,
Orthocerata 1
Orthoceratitidæ 109, 1
Orthonema..... 27, 46, 74, 80,
conica 40,
newberryi 67,
salteri.....
subtænista 51,
Orthonota..... 1
Orthonychia .....
Ostraca 2
Ostracoda..... 1
Ostrea..... 28, 33, 93, 94, 105, 111, 133, 136, 14 151, 158, 160, 172, 173, 205, 206, 2 211, 213, 216, 217, 219, 233, 236, 2 262, 266, 270, 2
——? .....
alabamensis 2
(Alectryonia) bellaplicata..... 1
blackii..... 151, 1
larva 1
linguafelis..... 2
procumbens 1
sannionis.... .... 136, 1
americana..... 1
anomiæformis 1
anomioides 76, 158, 1
apressa..... 1
atwoodi 237, 2
barrandei..... 1
bella..... 172, 21
bellarugosa 1
belliplicata..... 1
blackii 1
breweri..... 1
borealis..... 1
bryani..... 1
bourgeoisii..... 1
boussingaultii..... 1
carinata.....172, 1
carolinensis 172, 1
compressirostra..... 1
conchaphila 1

Page.
Ostrea confragosa ... 172
congesta ... 97, 172, 233, 273, 274
contracta ... **215**, 219, 237
convexa ... 172
cortex ... 133, 172, **219**
corticosa ... **269**
crenulata ... 172
crenulimarginata ... 172, 266
cretacea ... 172, 237
denticulifera ... 172, 266
disparilis ... 238
diluviana ... 172
divaricata ... 237
elegansula ... 172
engelmanni ... **22**, 95, 172
eversa ... 220, 237
exogyrella ... 172
falcata ... 172
falciformis ... 237
franklini ... 172
fundata ... 238
gabbana ... **28**, 172
gallus ... 238
georgiana ... 237
glabra ... **18**, 160, 168, 173
glanconoides ... **271**
glendiformis ... **270**
(Gryphæa ?) patina ... 97
uniformis ... **93**
(Gryphæostrea ?) subulata ... 97
heermanni ... 212, 213, 238
idriaensis ... 71, 173
inornata ... **21**, 97, 173
insecura ... **136**
larva ... 266
lateralis ... 173
linguloides ... **266**
littlei ... 173
lugubris ... **98**, 173, **219**
lurida ... 238
lyoni ... 173
malleiformis ... 173
marshii ... **241**, 242, 243
mesenterica ... 173
mortoni ... 173, 237
multilirata ... 173, **219**
nasuta ... 173
obrutus ... 209
orientalis ... 209
owenana ... 173
panda ... 173, 266
pandæformis ... 173
pansana ... **217**, 238
patercula ... 172
patina ... **16**, 173
peculiaris ... 173
pellucida ... 97, 173
percrassa ... 238
planovata ... 173
plumosa ... 173, 266
prudentia ... **133**, 173
quadriplicata ... 142, 173
robusta ... 173, **219**
sannionis ... 173
scapha ... 206

Page.
Ostrea sculpturata ... 238
sellæformis ... **205**, 237
soleniscus ... **66**, 76, 158, 173
strigilecula ... **133**, 172, 262
subalata ... 173
subfalcata ... 238
subjecta ... **217**, 238
subovata ... 173, **255**
subspatulata ... 173, 219, 266
subtrigonalis ... 105, 168, 173, **256**
syriaca ... **206**
tayloriana ... 238
tecticostata ... 173, 266
titan ... 216, 238
thirsæ ... 237
toroso ... 173
translucida ... **18**, 173
trigonalis ... 237
tuomeyi ... 173, 237
uniformis ... 173
veatchii ... 238
veleniana ... **219**, 238
velicata ... 173, **219**
vespertina ... 211, 213, 219, 238
vicksburgensis ... 237
virgata ... 206, **269**
virginiana ... 238
virginica ... 238
var. californica ... 243
vomer ... 173
wyomingensis ... 77
Ostreidæ ... 30, 33, 97, 105, 111, 183, 262, 266, 270, 271
Otozamites macombii ... **246**
Ovales ... 34
Oxystele ... 180
Oxyrhina mantelli ... 246
Oxytoma ... **33**, 49, 97, 142, 151, 153, 158, 262

P.

Pachycardium ... 99, 268
burlingtonense ... **268**
Pachydesma ... 215, 217
inesana ... **215**, 217
Pachydomus ... 225
antiquatus ... 225
cuneatus ... 225
levis ... 225
ovalis ... 224
pusillus ... 224
sacculus ... 224
Pachymya ... 143, 151, 158
austinensis ... 143
? compacta ... 151, 158
? herseyi ... 143
? truncata ... **70**
Pachyodon ... 101, 105
Pachyphyllum woodmani ... 192
Pachythærus ... 99
Palæoneilo ... 89
bedfordiensis ... **89**
Palæacis ... 154
cuneatus ... 154
cymbia ... 52
obtusa ... 52
umbonata ... 52
Palæacmea ... 1

Page.

Palæaster ... 78
dyeri ... 69, 78
granulosus ... 78
incomptus ... 70, 78
? jamesii ... 78
shaefferi ... 78
Palæchinidæ ... 43
Palæchinus ... 23, 43, 83
burlingtonensis ... 23, 43
gracilis ... 63, 83
Palæocampa ... 37, 47, 61
anthrax ... 37, 47
Palæocaridæ ... 37
Palæocaris ... 37, 46, 53, 61, 179
typus ... 37, 46, 61, 179
Palæochorda ... 259, 261
prima ... 259, 261
Palæocyclus ... 62
kirbyi ... 62
Palæomanon ... 192
roemeri ... 192
Palæomoera ... 100
Palæophycus ... 260, 261
occidentalis ... 260, 261
Palæophyllum ... 155
divaricans ... 155
Palasterina ... 24
(Shoenaster) fimbriata ... 24
Paliurus ... 143
pentangulatus ... 143
Pallium ... 215, 216, 217
crassicardo ... 215
estrellanum ... 215, 216, 217
Palmula sagittaria ... 47
Paludina conradi ... 16
leai ... 16
leidyi ... 16
multilineata ... 16, 221
peculiaris ... 16
retusa ... 16
trochiformis ... 16
vetula ... 16, 221
Pandora ... 216
bilirata ... 216
Panopæa ... 207, 210, 217, 269, 271
cooperi ... 19
decisa ... 269
elliptica ... 271
estrellana ... 50
(myacites) subelliptica ... 18
occidentalis ... 16
orientalis ... 210
pecterosa ... 207
texana ... 255
Papillina altilis ... 222
Papyridea (Liopistha) elegantula ... 47
rostrata ... 47
sancti-sabæ ... 47
Paracyclas ... 138, 149, 194, 235
elliptica var. occidentalis ... 149
occidentalis ... 194
peraccidens ... 235
sabina ... 138
Paradoxidæ ... 31, 108
Paradoxides ... 108, 198, 199, 248

Page.

Paradoxides acadicus ... 198
eteminicus ... 198
harlani ... 199
lamellatus ... 198
? nevadensis ... 65, 198
Paramithrax ... 159
? walkeri ... 159
Paranomia ... 266
lineata ... 266
scabra ... 266
Parapholas ... 143, 272
kneiskerni ... 272
sphenoideus ... 143
Pascecolus ... 56
dactylioides ... 56
Pasithea aciculata ... 221
lugubris ... 221
notata ... 221
scale ... 221
sulcata ... 220
striata ... 220
Patella ... 154
levettei ... 154
tenella ... 232
Patoceras ... 194
Patula ... 153
Pecopteris ... 246
bullatus ... 246
cyclopoba ... 246
falcatus ... 246
mexicana ... 246
? odontopteroides ... 231
undulata ... 231
var ... 231
Pecten ... 24, 30, 205, 207, 208, 211, 212, 213, 214, 215, 216, 217, 245, 260, 262, 266, 271
acutiplicatus ... 30
affinis ... 49
altiplectus ... 215
altiplicatus ... 217
bella ... 49
bellistriata ... 22
bellistriatus ... 49
broadheadii ... 51
calvatus ... 220
catilliformis ... 212, 214
(Chlamys) craticulus ... 266
comptus ... 224, 226
coosensis ... 256
delumbis ... 208
deserti ... 211, 213, 217
discus ... 217
extenuatus ... 22, 49
hawni ... 51
humphreysii ... 205
illawarrensis ... 226
kneiskerni ... 271
lenuisculus ... 226
magnolia ... 217
meekii ... 215, 217
missouriensis ? ... 51
mitis ... 226
(Monotis ?) coloradensis ... 245
nebrascensis ... 15
neglectus ... 51

Page.

Pecten nevadanus **212**, 214
newberryi **260**, 262
obrutus **208**
occidentalis 245, 274
pabloensis **216**
planicostatus **266**
propatulus 49, **206**
quadricostatus 255
quinquenarius 266
rigbyi **241**
rigida **13**, 47
squamuliferus (?) 266
(Syncyclonema?) periamellosus 266
tenuicollis **224**, 226
tenuilineatus **24**
tenuisculus **224**
tenuitestus 266
utahensis **22**
venustus 266
Pectenidæ 30, 260, 261, 271
Pectinibranchiata 34, 102, 106, 132, 134, 135
Pectinidæ 32, 33, 97, 132, 133, 263
Pectunculus 99, 217
ellipsis 220
nitens 50, **206**
patulus **206**
siouxensis **13**
subimbricatus **18**
Pectunculina parvula **15**
Pelagus vanuxemi 222
Penitella 212, 214
spelæa 214
spelæum **212**
Pennularia nobilis 203
varidis 203
Pentacrinidæ 33, 133, 262
Pentacrinites 33, 94, 262
asteriscus 236, 262
Pentacrinus 133
astericus **18**
asteriscus 33, 133
Pentadia **223**, 226
corona 226
reniformis **223**
spatangus **223**
trigonia **223**
Pentamerus 58, 62, 116, 123
borealis **62**
comis 58, 193
huspodus 247
lenticularis **116**
lotis **193**
oblongus 247
subglobosus **58**
Pentinidæ 133
Pentremites 26, 54, 83, 91, 118, 149, 249, 251
burlingtonensis **64**, 83
conoideus 149
cornutus 26
florealis 255
godoni 149
(Granatocrinus) granulosus .. **38**
laterniformis **249**, 251
melo **249**, 251
var. projectus **26**

Page.

Pentremites norwoodii **240**, 251
pyriformis 149, 248
sirius **118**
stelliformis **249**, 251
sulcatus 255
(Tricoelocrinus) obliquatus .. 91
(Troostocrinus?) woodmanii **54**, 83, 87
wortheni 83
Periploma claibornensis 220
Periplomya 269, 271
elliptica 269
truncata **271**
Perischæchinidæ 42, 43, 44, 60
Perissoptera 102
Peronæa 100
Peronæoderma 100
Perna 29, 32, 217
montana 50, **217**
torta 50
Pernopecten 59
shumardianus 59
Perisonota 268
protexta 268
Petalodus alleghaniensis 20
Petraster 26
wilberanus **26**
Petricola 211, 213, 271
nova ægyptica **271**
pedroana **211**, 213
Petricolidæ 271
Petrospongia 43
Phacops 59, 195
anchiops 232
callicephalus 232
rana 59, **195**
Phacopsidæ 109
Pharella 101, 158
dakotensis 101
? pealei **76**, 158
Phasianella haleana 48
perovata 48
punctata 48
Phenopora multipora **231**
Phillipsia 39, 74, 84, 87, 90, 149, 179, 196
——? 74, 253
bufo 149
coronata 196
(Griffithides) bufo **65**, 84
lodiensis 90
portlockii **39**, 84
sangamonensis **39**, 87, 179
scitula **39**, 87, 179
major 74
perannulata **256**, 257
scitula 74
stevensoni **69**
tuberculata **65**
Philocrinus 36
nebrascensis 36
pelvis 36
Pholadidæ 101, 270, 272
Pholadomya 29, 34, 35, 92, 100, 164, 205, 207, 209, 218, 269
(Cymella) undata 48
decisa **207**

Page.

Pholadomya (Goniomya) borealis **17**
(Homomya) sudax..... 225
curvata [?]..... 225
glendonensis..... **225**
humilis..... **21**, 34
kingii..... 164
marylandica **205**
occidentalis..... 269
orbiculata..... 35
papyracea **29**,100
(Platymya) undata 225
(Procardia) hodgii..... 100
roemeri..... **269**
sancti-sabæ..... 220
subelongata **17**,92
subventricosa 18,100
syriaca..... **269**
texana..... **218**
undata M. & H **15**, 48
undata Dana **223**
Pholadomyidæ..... 100
Pholas..... 205, 270
cithara 270
cuneata..... **18**
? lata..... **270**
petrosa **205**
Pholidocidaris 83
irregularis 83, 87
Pholidops 79, 192
bellula **192**
cincinnatiensis 79
quadrangularis **192**
Phonemus (Flabellina) cuneatus 47
sagittarius 47
Phorus..... 138, 208
exoneratus **138**
syriacus..... **208**
Phragmoceras 39, 91, 248
ventricosum ? 247
walshii. **39**,91
Phyllites..... 246
coriaceous..... **246**
venosissimus..... **246**
Phylloceras 93, 104
? halli 104
? ramosus 93
Phylloda..... 100
Phyllograptus..... 126, 129
loringi **126**,129
Phyllopoda 61
Phyllotheca australis 227
Phylloteuthis **21**,105
subovata 105
subovatus **21**
Physa 107, 135, 137, 141, 143, 161, 197
——? 143, 161, 167, 168
bridgerensis **77**, 135, 159, 170
carletoni **77**, 143, 167
copei **139**, 161, 169
felix 141, 161, 169
kanabensis **137**
longuiscula **16**
nebrascensis **16**
pleromatis **135**, 170
prisca 180, 197
rhomboidea **16**

Page.

——? secalina 107, 170
subelongata **16**
Physanoidæ 110, 230
Physella 107
Physetocrinus 81
Physidæ 106, 107, 135, 139
Physinæ 34
Physodon 107
Piestocheilus 49, 103, 150
vicksburgensis..... 222
Pileopsis tenella **226**
alta **226**
Pinna..... 73, 111, 121, 127, 132, 134, 158, 178, 196, 245, 250, 267, 270
calamitoides..... **256**
consimilis **196**
hinrichsiana..... **121**
inexpectans **196**
kingii..... **111**
lakesi **145**, 158
laqueata..... 267
? lingula **245**
ludlovi **250**
peracuta..... 73, 132, 178
petrina..... **127**, 134, 152
rostriformis 270
stevensoni..... **152**
Pinnidæ 111, 121, 132, 134, 267
Pinnularia affinis..... 229
amphioxys 229
digitus 229
gastrum 229
macilenta..... 229
mesogongyla 229
oregonica..... 229
pachyptera ? 203, 229
placentula..... 229
viridis..... 229
viridula 229
Pirenella..... 106, 161
Pisces..... 224
Pisidium 137
saginatum..... **137**, 168
Pitar..... 100
Placenticeras 93, 104
placenta..... 104
var. intercalare 104
(Sphenodiscus) lenticulare ... 104
vancouverense 93
Placunopsis..... 86, 90, 142
carbonaria..... **41**, 86, 87
billiardensis..... **142**
recticardinalis **90**
Plagiarca 98
Plagiostoma dumosa..... 222
echinatum..... 47
pelagicum..... 47
Planaria nitens 221
Planella..... 35
Planorbella 34, 106
Planorbinæ 34
Planorbis 34, 95, 106, 107, 112, 135, 137, 153, 159, 161
——? 135
æqualis **153**, 170
amplexus **17**

Page.

Planorbis (Bathyomphalus) amplexus..106, 161, 169
kanabensis.137, 169
plano-convexus ..106, 161, 169
cirratus.....159, 170
convolutus.....16, 106, 161, 169
var..... 106
fragilis..... 17
(Gyraulus) militaris 153, 170
leidyi 21, 107, 170
lunata..... 170
(Menetus) nebrascensis 107
vetustus 107
nebrascensis 170
spectabilis 22, 95, 112
var. utahensis 95, 112
subumbilicatus 16
tenuivolvis 17
utahensis 22, 135, 170
var. spectabilis..... 170
veternus 34, 167
vetulus 21
vetustus..... 170
Plantæ.....128, 259, 261
Planularia cuneata..... 47
Platyceras.....40, 57, 59, 60, 74, 80, 84, 86, 90, 117, 132, 149, 165, 178, 186, 194, 197
attenuatum..... 67
biserialis 60
bivalve 117
conradi..... 194
dumosum var. attenuatum..... 80
equilatera 84, 149
fissurella 84
haliotoides.....40, 59
infundibulum 84
lævigatum 40
minutissimum..... 186
multispinosum 67, 80
nebrascense 122, 179
nebrascensis..... 74
nodosum..... 194
occidens 197
(Orthonychia) obesteense 40
infundibulum... 40
lodiense.....67, 80
pyramidatum ... 57
quinceyense..... 60
subplicatum....40, 59
paralium 117
piso 197
[?] reversum..... 60
spinigerum 80
spirale..... 57
subundatum... 57
thetiforme..... 194
tortum 67, 90
tribulosum 165
unicum.....40, 84
undulatum 194
ventricosum..... 59
Platychisma depressum 226
oculus 226
rotundatum 226
Platycrinites 82, 83, 85

Page.

Platycrinites æqualis 82
burlingtonensis 82
(Eucladocrinus) montanensis 71
halli..... 82
hemisphericus 83
incomptus..... 83
planus 82
parvulus 85
subspinosus..... 82
tenuibranchiatus 82
Platycrinus .23, 26, 38, 42, 43, 59, 60, 117, 118, 127, 130, 144, 154, 163, 165, 248, 249, 250, 251
——? 127, 130
americanus 249, 251
boncensis.....144, 165
burlingtonensis 249, 251
corrugatus.....249, 251
discoideus 249, 251
hayden 163
hemisphæricus 38, 60, 154
incomptus..... 117
multibranchiatus..... 26
niotensis.....38, 60
oweni 26
parvulus 38
penicillus.....23, 44
planus 44, 59, 249, 251
plenus..... 23
(Pleurocrinus) asper.....26, 59
subspinosus..... 42
pleurovimensis..... 118
prattenanus.....23, 43
quinquenodus 118
scobina 26, 59
verrucosus 117
yandellii 249, 251
Platycostoma 25, 80, 148, 194, 197
inornatum..... 197
lineatum 194
nana.....25, 27
niagarense 148
var. trigonostoma.. 80
? trigonostoma..... 67
? tumida..... 25
Platychisma..... 196
? ambiguum 195
? depressum 223
? mccoyi 195
pelicoides 40
Platytrochus goldfussii 220
stokesii 220
Plectocolen ? diegoensis..... 220
parallelus 220
Plethomytilus..... 194
Pleurocrinus..... 38, 42
Pleurodictyum..... 57
problematicum..... 57
Pleurolimnæa 106, 161
Pleuromya 260, 262
newtoni.....260, 262
Pleurophorus .32, 33, 38, 45, 61, 73, 86, 90, 151, 197, 258
——?..... 92
? angulatus..... 38, 92
calhouni 33
? (cardinia) subcuneata 19

Page.

Pleurophorus costatiformis 38, 61
oblongus 73, 86
occidentalis 19, 32, 73, 258
meeki 197
subcostatus 38, 45, 151
? subcuneata 20,
subcuneatus 33, 51
tropidophorus 90
Pleurotoma 212, 214, 237
beaumontii 222
cælata 222
childreni 222
desmoyersii 222
kellogii 222
lonsdalii 222
minor 256
monilifera 222
nodocarinata 222
obliqua 222
ocoyana 212
pagoda 237
platysoma 237
sayi 222
texana 222
transmontana 212, 214
varicostata 222
venusta 237
Pleurotomaria 24, 32, 39, 43, 44, 45, 56, 63, 74, 79, 81, 89, 117, 147, 149, 151, 164, 165, 179, 191, 197, 248, 258
—— ? 63, 248
angulata ? 248
broadheadi 165
brazoensis 45
casii 56
chesterensis 25, 44
conoides 40, 87
cornula 232
coxana 40, 87
cyclonemoides 56
excelsa 246
granulostriata 24, 45
grayvillensis 74, 147, 164
gurleyi 67, 87
halliana 258
haydeniana 74
humerosa 19, 20, 32
inornata 74
lucina 81
lenticularis 248
lonensis 191
marcouiana 74
mississippiensis 117
morrisiana 224, 226
mullicäensis 49
(Murchisonia) meta 39
muralis 250
nevadensis 197
newportensis 165
nodomarginata 197
nuda 223, 226
obtusispira 258
perhumerosa 74
perizomata 151
peronata 258

Page.

Pleurotomaria prattemi 25, 45
proutiana 258
(Scalites ?) tropidophora 70, 79
scitula 25, 45
shumardi 25, 43
speciosa 25, 45
spherulata 179
spironema 40, 87
subscalaris 25, 46
subconstricta 24, 45
subdecussata 74
subturbinata 19, 30, 32
subsinuata 25, 45
streleckiana 226
tabulata 149, 179
taggarti 38, 164
tenuicincta 24, 45
texana 49
textiligera 67, 89
trifilata 223, 224
tumida 46
turbiniformis 25, 45, 179
uniangulata 231
valvatiformis 40, 87
Pleurotomariidæ 32, 39, 63, 163
Plicatula 93, 136, 142, 218, 266
arenaria 93
hydrotheca 136, 142
incongrua 219
striato-costata 53
urticosa 266
Plumulites 191
Podosphenia pupula 229
Podophthalma 32, 132, 133
Podozamites crassifolia 246
Pœcilopoda 189, 191, 195, 198
Polycœllia 275
Polynema 96
Polyphemopsis 27, 46, 86, 149, 155, 179
—— (?) 179
chrysallis 40, 86
fusiformis 149
inornata 46
nitidula 46, 155, 179
peracuta 46, 179
Polypi 71, 96, 108, 109, 121, 126, 148, 149, 177
Polypora 72, 127, 131
biarmica 52
marginata 52
mexicana 274
stragula 127, 131
submarginata 72
Polyrhytes 106
Polyzoa 38, 60, 68, 72, 78, 80, 88, 90, 94, 127, 131, 144, 147, 151, 163, 178
Porambonites 234
obscurus 234
Porcellia 59, 117, 118
crassinoda 117
nodosa 59
obliquinoda 118
Porifera 154, 189, 192
Porites astraformis 267
Porocrinus 37, 55
crassus 37, 55

Page.

Eurocrinus pentagonius 37, 55
Portlandia 98
Posidonomya 90, 110, 194
devonica 194
fracta 90
fragosa 110
lævis 194
Potamida 105
Poteriocrinites 77, 82, 83, 84, 85
biselli 84
(Dendrocrinus) caduceus ... 77
dyeri 68, 77
casei 77
cincinnatiensis 68, 77
polydactylus. 68, 77
posticus 77
hardinensis 84
macoupinensis 85
? perplexus 82
(Scaphiocrinus) æqualis 83
bayensis ... 84
carbonarius. 85
coreyi 83
depressus .. 83
hemisphericus 85
huntsvillæ . 84
macadamsi . 83
randolphensis 84
unicus 83
(Zeacrinus) arboreus 84
armiger 84
cariniferous 84
compactilis 89
compactilus 84
concinnus 64, 83
formosus 84
[Hydreionocrinus] acanthoporus. 85
mucrospinus ... 85
subtumides 84
Poteriocrinus 23, 26, 37, 38, 42, 43, 60, 85, 91, 118 163, 249, 251
bursæformis 118
carinatus 26, 60
depressus 85
? enormis 26
hemisphericus 52
indianensis 38, 60
montanaensis 163
obuncus 118
occidentalis 249, 251
rhombiferus 249, 251
saligneideus 118
(Scaphiocrinus) bayensis ... 38
carbonarius. 26
decadactylus 23, 43
norwoodi ... 38
solidus 26
subtumidus. 38
tenuidactylus 38, 60

Page.

Poteriocrinus (Scaphiocrinus) unicus..... 91
wachsmuthi. 26
spinosus... ..... 249, 251
subimpressus..... 26, 60
swallovi 23, 42
tenuibrachiatus 26, 60
tumidus..... 249, 251
(Zeacrinus) carbonarius 37
Priscoficus hornii 221
Prionocyclus..... 94 104, 159, 265
macombi..... 94
(Prionotropis) woolgari..... 104
wyomingensis 159, 265
Prionotropis..... 104
Procardia 100
Productella..... 193
Productidæ 31, 62, 108, 109, 121
Productus ... 24, 26, 30, 44, 45, 58, 61, 62, 72, 85, 89, 92, 94, 106, 109, 119, 130, 131, 149, 155, 163, 177, 193, 196, 233, 235, 257
—— ?..... 62, 89, 109, 232
æquicostatus 253, 274
brachythærus..... 225
calbounianus 20, 245, 257
cancrini 52
cora 177, 243, 255
var. mogayoni..... 243
costatoides..... 245
costatus..72, 109, 131, 149, 177, 243, 245, 255
? 232
delawarii 243
dissimilis..... 62
elegans..... 235
exanthematus 58
flemingii 52, 243
var. burlingtonensis ... 235
fragilis..... 223, 225
giganteus..... 163
hirsutiforme..... 193
horrescens..... 52
horridus 52
ivesi..... 245
koninckianus..... 52
lævicostatus ?..... 235
lævicostus..... 116
lasallensis 85
latissimus 92
lepiayi ?..... 257
longispinus..... 52, 72, 85, 109, 131, 177
magnus 26, 61
mexicanus... .....131, 256, 257
multistriatus..... 22, 94, 109
muricatus 131
nanus 24, 45
nebrascensis 52, 72, 85, 131, 177, 250, 274
nevadensis 109
nodosus 245, 246
norwoodi 20, 257
occidentalis 245
orbinianus..... 52
parvus..... 24, 44, 130
pertenuis 72
pileolus 256, 257
popei..... 256, 257

Page.

Productus prattenianus 20, 52, 72, 109, 131
(Productella) hallanus..... **193**
lachrymosus var. limus..... 193
lachrymosus var. stigmatus 193
lachrymosus navicella..... 193
speciosus 193
subaculeatus..... 193
shumardianus..... 193
truncatus 193
punctatus....72, 85, 131, 155, 177, 243, 255
pustulosus (?) 20, 242
pyxidiformis 243
rogersi 20, 52, 233, 245
scabriculus 243, 245
scitulus **24**, 43
semireticulatus..30, 72, 109, 131, 177, 232, 233, 235, 243, 245, 274
var. antiquatus .. 257
semistriatus **22**, 94, 109
splendens (?) 20, 245, 253, 274
subaculeatus 94, 108, 196
subhorridus **109**
symmetricus 72, 177
villiersi 274
viminalis **119**
Prœtidæ..... 109
Prœtus 39, 59, 79, 81, 109, 195, 232, 235
ellipticus **39**, 59
haldemani..... 196
loganensis..... **235**
marginalis 196
peroccidens **235**
(Phæton) denticulatus..... **109**
planimargitus **67**
planimarginatus 81
spurlocki **69**, 79
Promacrus 68, 89
andrewsi 89
Protarea 155
vetusta..... 155
Protaspongia..... 189
fenestrata..... 189
Protaster 78, 83
? granuliferus 70, 78
? gregarius 83
Prothyris 74, 89
elegans **69**, 74
meeki 76
Protista 154
Prosobranchiata 32, 34
Prosopocephala 132, 264
Protocardia 34, 92, 99, 218
(Leptocardia?) pertenuis 100
rara..... 100
subquadrata... 100
(Protocardia) salinaensis..... 99
scitula 92
shumardi 34
Protocaris **199**
marshi **199**
Protocardium 268, 271
curtum 271

Page.

Protozoa.....31, 41, 43, 55, 56, 58, 71, 120, 121, 131, 177
Psammobia 260, 262
? cancellato-sculpta..... 46
? prematura **260**, 262
Psammobiidæ 260, 262
Pseudobuccinum **18**, 103
nebrascensis.....**18**, 103
Pseudoliva sulcata 222
Pseudomonotis.....73, 262
(Eumicrotis) curta..... 262
orbiculata.**260**, 262
hawni 51
radialis 73
sinuata 51
Pseudonautilus 104
Pseudoptera 97, 143
Psephis tantilla..... 59
Psilomya..... 124
Pteria 33, 97, 142, 151, 153, 158, 260, 262, 267
abrupta 47
convexo plano 47
cretacea..... 47
haydeni 47, 97
iridescens..... 47
laripes 47, 267
linguiformis 47, 97, 262
var. subgibbosa..... 97
[?] multangula 59
navicula **267**
nebrascana..... 47
(Oxytoma) erecta **153**, 157
? gastrodes 143
mucronata 180
munsteri 33, 49
nebrascana.....97, 263
salinensis **151**, 158
parkensis 142
pedernalis..... 47
petrosa.....47, 267
planisulca..... 47
(Pseudoptera) fibrosa 97, 263
propleura 143
sublevis **260**, 263
(Pterinea) morganensis **40**
? ? stabilitatis **158**
subgibbosa..... 47
triangularis 47
Pteriidæ 29, 30
32, 33, 97, 110, 111, 132, 133, 260, 267, 270
Pteriinæ 32, 33
Pterinea 29, 45, 56, 58, 59, 194, 196
flabella 194
macroptera 226
(Monopteria) gibbosa.....**41**, 45
newarkensis **194**
pintoensis **196**
(Pteronites?) newarkensis **67**
? subpapyracea.....**41**, 58
thebesensis **56**
undulata..... **59**
Pteriniinæ 29, 32, 33
Pterinopecten 196
hoosacensis..... **196**
spio **196**
Pterocerella..... 48

Page.
Pterocerella tippana 48
Pterocephalus 190, 234
Pterophyllum robustum 246
fragile 246
Pteropoda 28, 31, 39, 56, 67, 84, 89, 118, 126, 138, 149, 151, 165, 189, 191, 195, 198
Pterotocrinus 44
chesterensis 44
crassus 44
Ptilodictya 78, 80, 90, 144, 147, 151, 163
(Stictopora) carbonaria 67, 90
gilberti 66, 80
serrata 90
shafferi 68, 78
triangulata 144, 147, 151, 162
Ptychaspis 186, 190, 234
minuta 190
pusulosa 234
speciosus 186
Ptychoceras 104, 265
crassum 261, 265
leai 49
meekanum 261, 265
mortoni 17, 104
verneuilii 49
Ptychoceratidæ 104
Ptychodus whipplei 243, 246
Ptychoparia 129, 190, 191, 198, 199
? annectans 191
anytus 190
(Eulcma ?) affinis 190
dissimilis 190
granulosus 190
haguei 190
lævicepa 190
linnarssoni 190
nitidus 190
occidentalis 190
orestes 199
var. thersites 199
onangondiana 198
var. aurora 199
oweni 190
pernasutus 190
prospectensis 190
(Pterocephalus) laticeps 190
occidens 190
quadrata 199
robbi 198
regersi 199
similis 190
var. robustus 190
(Solenopleura ?) breviceps 190
tener 199
unisulcatus 190
Ptychophyllum 108
? infundibulum 108
Ptychopteria 196
protoforme 196
Pulmonaria 61
Pulmonata 102, 105, 107
Pulmonifera 34, 135, 197
——? 264
Psilomya 101, 127
Pupa 137, 159
Page.
Pupa arenula 137, 159, 170
atavuncula 159, 170
bigsbyi 167
helicoides 18
incolata 137, 170
? leidyi 77
(Leucocheila) incolata 159
vermillionensis 167
vetusta 167
Purpura 212
Pyramis 225
Pyramidellidæ 103, 134
Pyramimitra costata 221
Pyramus 224
ellipticus 224
myiformis 224
Pyrgorhynchus mortonis 222
Pyrgulifera 70, 95, 162
humerosa 95, 112, 162, 168
Pyrifusus 103
? flexicostatus 49
? haleanus 49
? impressus 49
intertextus 49
(Neptunella) intertextus 103
newberryi 103
subturrites 103
newberryi 49
subturrites 49
Pyrina parryi 233
Pyropsis 103
bairdi 103
var. rotula 103
Pyrula bairdi 14, 16, 49
glabra 256
modesta 50

Q.

Quadrula 105

R.

Radiata ... 33, 37, 40, 41, 42, 43, 44, 45, 54, 55, 56, 57, 58, 60, 68, 71, 77, 85, 94, 96, 108, 109, 117, 133, 136, 138, 142, 144, 154, 165, 226, 227, 235, 236, 260, 261.
Radix 105
Radula 266
acutilineata 266
pelagica 266
reticulata 266
Raphistoma 55, 108, 130, 191, 234
acuta 234
lenticularis 55
nasoni 191
? rotuliformis 108
? trochiscus 108, 130
Receptaculites 55, 91, 129, 190
—— ? 55, 129
ellipticus 190
elongatus 190
formosus 64, 91
globularis 55
mammillaris 190
oweni 55
Remopleurides 185
striatulus 185

Page.

Rensselleria 57, 63
conradi 57
lævis 63
Requienia 176
patagiata 176
texana 176
Retepora archimedes 248
indianensis 248
Retzia 30, 72, 79, 116, 131, 147, 163, 178, 196, 257
acambonia 119
(Ambona?) altirostris 119
compressa 30
? meekana 256
meekiana 257
mormonii 20, 52, 131, 178
papillata 256, 257
punctulifera 73
radialis 196
sexplicata 116
(Trematospira) granulifera 68, 79
woosteri 147, 163
Rhaphonels foliacea 229
lanceolata 229
oregonica 229
Rhiphidoglossa 102, 132, 133, 134
Rhiphidoglossata 32, 34
Rhizopoda 31, 129, 131, 190
Rhodea 106
Rhodocrinus 59, 150, 163
nanus 40, 59
vesperalis 150, 163
Rhombopora 71, 131
lepidodendroides 71, 131
Rhynchonella 24, 30, 41, 57, 59, 72, 78, 80, 85, 116, 118, 126, 127, 130, 131, 148, 163, 165, 177, 193, 196, 235, 236, 245, 257, 262
—— ? 30, 33, 36, 62, 257, 274
angulata 52
argenturbica 196, 130
capax 78, 148
caput testudinus 118
carolina 80
castanea 62, 193
dentata 78, 148
duplicata 193
[illegible] 193, 235
[illegible] 68, 163
[illegible] 196
[illegible] 30, 236
[illegible] 256, 257
[illegible] 193
[illegible] 237
[illegible] 193
[illegible] 193
[illegible] 193
[illegible] 127, 131
[illegible] 41, 59
[illegible] 236, 262
[illegible] 30
[illegible] 79
[illegible] 69
[illegible] 193
[illegible] 126
[illegible] 72, 93
[illegible] 125, 165

Pa

Rhynchonella pugnus ..... [illegible]
pustulosa 116,
rockymontana ..... [illegible]
speciosa ..... [illegible]
subtrigona ..... [illegible]
tennesseensis ..... [illegible]
tethys ..... [illegible]
texana 2
thera 1
uta 20, 52, 131, 177,
wasatchensis 127,
wilmingtonensis ..... [illegible]
Rhynchonellidæ 30, 33, 62, 108, 109, 131,
Rhytophorus 95, 112, 137,
meekii 137, 161,
priscus 95, 112, 161,
Rimella curvilirata ..... [illegible]
Ringicula acutispira ..... [illegible]
biplicata ..... [illegible]
pulchella ..... [illegible]
subpellucida ..... [illegible]
Ringiculidæ ..... [illegible]
Ringiculinæ ..... [illegible]
Ringinella subpellucida ..... [illegible]
Rissoidæ ..... [illegible]
Rostellaria ? ..... [illegible]
americana 48, 1
biangulata 1
? collina 1
(texana) 1
fusiformis ..... [illegible]
indurata 1
nebrascensis 48
rostrata ..... [illegible]
Rostellites 214
bellus ..... [illegible]
biplicatus ..... [illegible]
conradi ..... [illegible]
nasutus ..... [illegible]
texana ..... [illegible]
texanus 1
Rostrifera ..... [illegible]
Rotella ..... [illegible]
nana ..... [illegible]
verruculifera ..... [illegible]
Rotundaria ..... [illegible]

S.

Saccocrinus ..... [illegible]
christyi ..... [illegible]
Sagenella ..... [illegible]
ambigua ..... [illegible]
Sanguinolaria ..... [illegible]
oblata ..... [illegible]
Sanguinolites 68, 80, 89, 19
acolus 8
? combensis ..... [illegible]
? gracilis ..... [illegible]
? marnia ..... [illegible]
obliquus ..... [illegible]
? obliquus ..... [illegible]
(Praenucrus) missouriensis ..
nasutus ..... [illegible]
rigidus ..... [illegible]

Page.

Sanguinolites retusus **197**
salteri **197**
sanduskyensis **66**, 80
? sanduskyensis 194
simplex **197**
striatus **197**
Sanguinolites ventricosus 194
Sarcinula 223
costata 247
? obsoleta **232**
(Porites ?) glabra **247**
Saxicava 211, 213, 260, 263
abrupta **211**, 213
jurassica **260**, 263
Saxicavidæ 101, 269, 271
Scala forbesii 48
Scalaria 205, 237
cerethiformis **14**
expansa **205**
forbesii 48
texana 48
unilineata **237**
Scalpellum inequicostatum 48
Scambula 268
perplana 268
Scaphiocrinus 26, 43, 60, 72, 82, 83, 84, 85, 91, 117, 144, 149, 165
clio 82
delicatus 82
depressus **64**
fiscellus 82
gibsoni **144**, 149, 165
gurleyi **144**, 149, 165
? hemisphæricus 72
juvenis 82
macrodactylus 82
nanus 82
notabilis 82
penicillus 82
rudis 82
rusticellus **117**
scalaris 82
striatus 82
tethys 82
(Zeacrinus) asper 82
lyra 82
scobina 82
serratus 82
Scaphites 28, 104, 135, 250, 265
(Ammonites ?) comprimus **250**
nodosus **250**
(Discoscaphites) abyssinus 104
cheyennensis ... 104
conradi 104
var. gulosus. 104
conradi var. intermedius 104
mandanensis ... 104
nicoletii 104
larvæformis **19**, 104
mandanensis 274
nicolleti 274
nodosus 265
var. brevis 104, 265

Page.

Scaphites nodosus var. plenus 21, 104
quadrangularis 104, 265
ventricosus **28**, 104
vermiculus 159
vermiformis **28**, 104
warreni 104, 135, 265
wyomingensis 265
Scaphitidæ 104, 135, 265
Scaphoides 33
Scenella 189
? conula **189**
Schænaster 44, 60
fimbriatus 44
wachsmuthi **40**, 60
Schizambon **190**
typicalis **190**
Schizocrinus nodosus ? 231
Schizodesma 100
Schizodus 24, 32, 44, 45, 73, 86, 89, 132, 178, 194, 197
—— ? 45
amplus **64**, 86
chesterensis **24**, 44
cuneatus 90, 197
curtiforme **197**
curtus **41**, 73, 86
(Cytherodon) orbicularis **194**
deparcus **197**
medinaensis **67**, 89
obscurus 51
ovatus 32
(Prisconia) perelegans 86
rossicus 51, 52, 87
subtrigonalis **67**
pintoensis **197**
wheeleri 73, 132, 178
Schizopyga 215, **216**
californiana **215**, **216**
Schizothærus 211, 213
nutalli **211**, 213
traskei **211**
Schœnaster 24
Scoliostoma 195
americana **195**
Scorpio carbonarius **53**
Scutella 205
aberti **205**
crustuloides 222
jonesii 222
lyelli 220
pileus-sinensis 222
rogersi 222
Seacrinus (Prisconaia) perelegans **64**
Sedidæ 98
Sedgewickia 32, 38, 61, 79, 236
altirostrata 32
concava 32, 236
? compressa **68**, 79
? fragilis **68**, 79
(Grammysia ?) neglecta **68**, 79
(Sanguinolites) ? subarcuata .. 38, 61
topekaensis 32
Semicassis sowerbii 221
Seila 102
Septopora cestriensis 87
Septastrea ? sexradiata 46

Page.

Serpula 35, 105, 135, 144, 165
insita **144**, 165
intrica **135**
(Spirorbis) planorbites 51
? tenuicarinata 105
? tenuicarinatus **17**
Serpulidæ 35, 105, 135
Serrifusus 103
Sigaretus scopulosum 59
scopulosus **206**
Siliqua 270
cretacea 270
Sinistralia 103
Sinuopallia 264, 269
Sinum scopulosum 50
Siphonariidæ 102, 112
? 264
Siphonida 268
Siphonostomata 264
Siphonotreta ? curta **225**
Skenidium 192
devonicum **192**
Smithia 62, 108
hennahii 108
(Pachyphyllum) woodmani 123
verrilli **62**
Solariidæ 108, 180
Solariorbis depressus 221
lineatus 221
nitens 221
Solarium 180
abyssinus 48
henrici 221
ornatum 221
pseudogranulatum 221
wallalense **180**
Solecurtus ? ellipticus 225
(Psammobia ?) planulatus 225
Solemya 24, 80, 99, 153
bilix **153**, 157
(Janeia) vetusta 80
protexta 50
radiata **24**
suplicata 99
ventricosa **205**
Solemyidæ 99
Solen curtus 50
? dakotensis **18**
diegoensis 220
irradians 48
parallelus 220
(Solecurtus ?) ellipticus **223**
planulatus **223**
subplicatus **15**
Solenidæ 101, 279
Soleniscus **25**, 46, 151, 178
brevis **151**
(Macrocheilus) fusiformis 175, 178
medialis 175, 178
newberryi 175, 178
paludinæformis 175, 178
ponderosus 175, 178
primigenius 175, 178
texanus 175, 178
ventricosus 175, 178

Page.

Soleniscus planus **151**, 175, 178
typicus **25**, 46, 175, 178
Solenocaris 90
Solenochilus 65, 104
Solenoconchæ 101, 132, 264
Solenoides **250**
iowensis **250**
Solenomya 45, 87, 90, 197
? ? anodontoides **90**
biarmica 50
curta **197**
(Janeia) vetusta **66**
radiata 45
Solenopsis 74
solenoides 74
Solidula biplicata 48
Solyma 269
lineolata 269
Spatangidæ 98
Sphæra 110
whitneyi **110**
Sphærella inflata 220
Sphærexochus 91
romingeri 91
Sphæriola 99, 260, 264, 269
? cordata 99
? endotrachys 99
? obliqua **88**
transversa **260**, 264
umbonata **260**
? warrenana 99
Sphærium 105, 112, 135, 160
—— ? 135
formosum 105, 160, 168
idahoense **65**, 112, 166, 170
planum **21**, 105, 160, 168
recticardinale **21**, 105, 160, 168
rugosum **65**, 112, 166, 170
subellipticum 105, 160, 168
Sphærocrinus **37**
Sphenodiscus 104
Sphenophyllum 155
Sphenophyllum emarginatum 155
schlotheimi 155
Sphenopteris 149, 246
acuta 149
fremonti **231**
lobifolia 226
paucifolia **231**
triloba 231
trifoliata **231**
Sphenopoterium **24**, 41, 43
compressum **24**, 43
cuneatum **24**, 43
enorme **24**, 41
var. depressum 41
obtusum **24**, 43
Spherocoryphe 185
robustus **185**
Spiractæon 29
Spiraxis 221
Spirifer ... 30, 31, 41, 44, 57, 58, 61, 62, 73, 89, 90, 91, 92, 94, 108, 109, 116, 118, 127, 130, 131, 148, 149, 155, 163, 165, 178, 225, 233, 245, 253, 257
—— ? 20, 36, 255

Page.

Spirifer acuminata 149
agelaius 163
annectans **196**
cameratus 20, 52, 73, 85, 94, 131, 149, 178, 233, 245, 246, 257
carteri 89
cedarensis 250
centronatus 180
compactus **62**
cupidatus 109
darwinii 225
desiderata **196**
duodecicostatus 225
englemanni 57, 94, 108
euritines 149, 250
extennatus 130
fastigatus **64**, 91
formacula 58
fultonensis 85
glaber 225
var. contracta **26**
glans cerasus **118**
gregaria 149
guadalupensis 257
hemicyclus **57**
hemiplicata 20, **232**
hirtus **116**
inequicostatis **250**
iowensis **250**
kentuckensis 20, 233, 274
kennicotti **62**
keokuk 92
laminosus 52
leidyi 196
ligus **250**
lineatus 20, 233, 243, 245
(Martinia) cooperensis 41
franklinii **63**
glaber var. contracta ... 44, 127, 131
lineatus 30, 155, 178
maia 193
meristoides **63**
peculiaris 130
plano convexa 178, 274
plano convexus 31, 73, 131
richardsoni **63**
sublineatus **63**
undifera 193
mensebachanus 274
mexicanus **256**, 257
moosak paliensis 52
neglecta 196
neglectus 91
octoplicata? 232
paradoxus 58
perextensus **58**
perlamellosus 57
pennatus **250**
planoconvexa 20, 274
propinquus 61
radiata 148
rocky-montani **243**, 245
rocky montanus 131
solidirostris **116**

Page.

Spirifer sphaena **225**
(Spiriferina) cristata 196
scobina 94
pulcher 94
striatus 130, 131, 243
var. triplicatus 243
strigosus 94
subcardiiformis 165
suborbicularis 91
subundiferus **58**
sulcifera **256**, 257
textus 140
trigonalis 196
(Trigonotreta) argentarius **108**
biplicatus 89
cameratus 109
opinus 90
pinonensis **65**, 108
scobina 109
striatiformis 89
strigosus 108
texanus **68**
? texanus 246
triplicata **232**
utahensis 94, 108
vespertilia 225
Spirifera 193, 196, 235
——? 193, 235
alba-pinensis **235**
centronata 235
disjuncta 193
engelmanni **22**, 193
macra **22**
(Martinia) glabra 193
var. nevadensis. 193
norwoodi **22**
parryana 193
pinonensis 319
pulchra **22**
raricosta 193
scobina **22**
setigera 235
(Speriferina?) alia **236**
striata 235
varicosa 193
Spiriferidæ 31, 62, 108, 109
Spiriferina 30, 73, 109, 118, 127, 131, 178, 196, 236, 257
——? 30, 109
billingsii **256**, 257
homfrayi? 236
kentuckensis 52, 73, 131, 178
(Martinia) glabra 193
octoplicata 131
pulchra 109
spinosa var. campestris 127
subtexta **119**
Spirigera 127, 130, 132
Spirigera —— ? 20
monticola **127**, 130
obmaxima 130
planosulcata 132
subtilita 20, 132
Spironema 48, 103
bella 48

Page.
Spironema tenuilineata 48, 103
Spirorbis 106, 153
? dickhauti **153**
helix 51
Spirulæa rotula 49
Spondylidæ 266
Spondylus 217, 266
dumosus 222
echinatus 47
estrallensis **215**
estrellanus **217**
gregalis 266
Spongiæ 41, 43, 56, 58, 91
Spongiolites 203
Spongolithis acicularis 229
aspera 229
fustis 229
mesogonyla 229
Stagnicola 106
Stralagmium concentricum 220
Stauroneis baileyi 229
semen 229
Stavelia 98
Steganocrinus **40, 42,** 59
araneolus 42
pentagonus 42, 59
sculptus 42
Stephanodiscus —— ? 203
Stenaster 78
grandis **69,** 78
Stenophora columnaris 52
Stenotheca 189
acadica 198
elongata **189**
Stramonita 212, 214
petrosa **212,** 214
Straparollus 25, 26, 30, 42, 44, 46, 74, 87, 195, 258
—— ? 258
Straparollus cornudanus **258**
(Euomphalus) minnesotensis ... **250**
pernodosus **65,** 87
rugosus 74
subquadratus ... **65,** 87
subrugosus 87
lens 42
newarkensis **195**
planidorsatus 44
similis **26,** 44
var. planus 26, 44
umbilicatus 46
Streblopteria 45, 196
similis **196**
? tenuilineata 45
Strephona 212, 214
pedroana **212,** 214
Strepsidura 237
conybearii 292
Streptacis 86
whitfieldi **67,** 86
Streptelasma 155
corniculum 155
Streptorhynchus .. 116, 119, 177, 190, 192, 235, 245, 257
chemungensis 199
equivalvis .....
inflatus 116
Streptorhynchus lens .....
minor .....
occidentalis .....
(Orthisimia) shumardia
pyramidalis .....
umbraculum .....
Striarca .....
Striatopora .....
carbonari .....
linnæana .....
missouriensis .....
Stricklandinia .....
castellana .....
davidsoni .....
deformis .....
elongata var curta .....
Stricklandinia salteri .....
Strobilocystites .....
calvini .....
Stromatopora .....
Strombus .....
pervetus .....
pustulifera .....
Stromomena rhomboidalis .....
Strophalosia .....
(Aulosteges) guadalupensis
Strophodonta 148, 19
arcuata .....
beckii .....
canace .....
calvini .....
? costata .....
demissa .....
headleyana .....
inequiradiata .....
iowensis .....
parva .....
patersoni .....
perplana .....
punctulifera .....
Strophites grandæva .....
Strophomena 56, 57, 58, 62, 78, 89, 12
148, 190, 192, 23
alternata .....
angulata ? .....
convexa .....
deltoidea .....
filitexta .....
Fontinalis .....
(Hemopronites) crenistria
filitexta .....
nutans .....
plano-convex
planumbona
ulcata .....
nemes
nasuta
plani
rhon
ser
[illegible]

Page.

Strophomena (Strophodonta) subdemissa .. 62
unicostata **56**
Strophomenidæ 31, 62, 108, 109
Strophostylus 57
cancellatus **57**
Strotocrinus **40**,42, 81
? asperrimus..... 81
ectypus 81
liratus 81
perumbrosus 42, 81
(Physetocrinus ?) asper 81
dilatatus 81
regalis..... 42
Stylioia 195
fissurella..... 195
fissurella var. intermittens..... 195
Subulites 56, 91
inflatus **65**, 91
(Polyphemopsis) brevis 56
Succinea 137, 159
(Brachyspira) papillispira.....159, 170
papillispira..... **137**
Sureula 103
beaumontii..... 222
cælata..... 222
childreni 222
desmoyersii..... 222
kellogii 222
monilifera..... 222
nodocarinata..... 222
obliqua..... 222
sayi..... 222
varicostata..... 222
Sureulites..... 103
Surilella bifrons..... 229
plicata..... 229
Surirella 203
campylodiscus 203
splendida 203
Sycotypus 212, 214
ocobanus 214
ocoyanus 50, **212**
penitus..... 221
Symphysurus 101
? goldfussi **191**
Synbathocrinus 53, 63, 81, 82, 91
brevis **63**, 82
dentatus **249**, 251
robustus 91
wachsmuthi **40**, 63, 82
Syncyclonema..... 47, 97, 263
? rigida..... 47, 97, 263
Synedra spendida 229
ulna 229
Synocladia 72, 99, 131, 178
[illegible] biserialis 19, 52, 72, 90, 131, 178
piriformis ? 247
[illegible] 52
[illegible] var. biserialis..... 87
..... 45, 72, 85, 177
45, 72, 85, 177
[illegible], 131, 186
.. 169
[illegible], 120
82

Page.

Syringopora lineata ? 247
maclurei 156
multattenuata 72, 131
perelegans 156, 192
Syringothyris 196
cuspidata..... 196

T.

Tænioglossa..... 132, 135
Tæniopteris elegans..... **246**
glossopteroides..... **246**
magnifolia 246
Tamiosoma..... **215**, 216
gregaria..... ..... **215**, **216**
Tancredia 34, 99, 143, 164, 262
? æquilateralis **21**, 34
americana..... 99
bulbosa **260**, 262
? cælionotus **143**
corbuliformis..... **260**, 262
extensa..... 164
? inornata..... 262
postica **260**, 262
warrenana **21**, 34, 262
Tancrediidæ 34, 99, 262
Taonurus 155
colletti 155
Tapes..... 158, 211, 213, 215, 216, 217, 259
—— ? 217
diversum **211**, 213
hilgardi..... 158
inezensis **217**
lineatum **215**, 216
montana..... .... **217**
montanensis **259**
wyomingensis **70**
Taphius 34, 106
Taxocrinus 37, 44, 58, 60, 82, 149
gracilis **37**, 58
multibrachiatus var. colletti.... 149
semiovatus..... 44
thiemei..... 82, 87
Tectibranchiata..... 101, 264
Tectura ? occidentalis 48
Tecturidæ 134
Tellimera..... 269
eborea 269
Tellina. 28, 100, 111, 207, 209, 211, 212, 213, 214
albaria **206**
(Arcopagia) ? cheyennensis 107
arctata **206**
bitruncata..... **206**
? cheyennensis 15
congesta **211**, 213
dariena..... **212**, 214
diegoana **211**, 213
emacerata **206**
equilateralis 15
? formosa **21**, 48
gracilis 15
? isonema..... 111
modesta 111
nasuta..... **206**
nitidula **28**
obruta..... **207**

Page.

Tellina occidentalis 243
ocoyana..... **212**, 214
(Œne ?) subscitula..... 100
pedro..... **211**
pedroana..... 213
(Peronæa ?) equilateralis..... 100
scitula..... 100
plana..... 220
prouti..... **15**
scitula..... **15**
subelliptica..... **15**
subscitula..... **70**
subtortuosa..... **16**
syriaca..... **207**, 209
Tellinella..... 100
Tellinidæ..... 100, 111, 269
Tellinides..... 100
Tellinomya..... 55, 79, 190
alta..... 55
contracta..... 190
? hamburgensis..... **190**
? obliqua..... 79
protensa..... **232**
ventricosa..... 55
Tellinula..... 100
Temnochilus..... 65, 104
Tenea..... 269
pinguis..... 269
Tentaculites..... 39, 56, 138, 195
attenuatus..... 195
bellulus..... 195
gracilistriatus..... 195
hoyti..... **138**
oswegoensis..... **39**, 56
scalariformis..... 195
sterlingensis..... **39**, 56
tenuistriatus..... **39**, 56
Terebra..... 237
plicifera..... **237**
Terebratella..... 265
plicata..... 265
vanuxemi..... 265
Terebratula..... 30, 73, 85, 130, 132, 146, 154, 162, 178, 196, 209, 218, 233, 235, 236, 257, 259, 265
—— ?..... 30, 206, 225
amygdala..... **223**, 225
augusta..... 146, 162, **236**
bovens..... 85
bovidens..... 73, 178
burlingtonensis..... **116**
choctawensis..... 218, **255**
(Diclasma) bovidens..... 132
burlingtonensis..... 130
elongata..... **223**, 225, 257
formosa..... 154
harlani..... 265
hastata..... 196
helena..... **259**
hermonensis..... **209**
humboldtensis..... 236
lachryma..... 222
leonensis..... **220**
marcyi..... 255
mexicana..... **233**
millepunctata..... 20, **233**

Page.

Terebratula mormonii..... **243**
nitens..... 49, **206**
perinflata..... **257**
plano-sulcata..... 243
rocky montana..... **243**
royssii..... 243
semisimplex..... **146**, 162
subtilita..... **232**, 233, 243, 253, 255, 274
uta..... **243**
utah..... **235**
waccensis..... 218
wilmingtonensis..... 220
Terebratulidæ..... 30, 121, 122, 265
Terebratulina atlantica..... 265
floridana..... 265
lachryma..... 265
Terebrispira..... 103
Teredidæ..... 101, 270, 272
Teredo..... 101 270, 272
emacerata..... **272**
globosa..... **18**, 101
irregularis..... 270
selliformis..... **21**, 101
substriata..... 206
tibialis..... 270
Tessarolax..... 158
hitsii..... **158**
Testacea..... 246
Tetrabranchiata..... 33, 35, 103, 132, 135, 263, 265
Tetradecapoda..... 36, 46, 61, 90
Teuthidæ..... 105
Textularia phyllodes..... 47
Thaleops ?..... 248
Thallogenes..... 128
Thaumastus..... 106, 161
limnæformis..... 106, 161, 169
Theca..... 28, 31
gregaria..... 31
lanceolata..... 226
(Pugiunculus) gregarea..... **28**
Thecia ramosa..... 192
Thecosmata..... 31
Thetis..... 100, 264
? circularis..... 100, 264
Thracia..34, 92, 100, 151, 158, 215, 216, 259, 261, 262, 264
? arcuata..... **21**, 34
(Corimya) grinnelli..... **259**
gracilis..... 100
mactropis..... **213**, 216
myæformis..... **151**, 158
? occidentalis..... **17**, 92
? prouti..... 101
subgracilis..... **261**, 264
? sublevis..... **21**, 34, 262
? subtortuosa..... 100
subtruncata..... **17**, 92
trapezoides..... **205**
Thyatira [?] bisecta..... 50
Tiara humerosa..... 221
Tinoporus (Orbitolina) texanus..... 47
Tornatella elliptica..... 50
Tornatellæa impressa..... 220
Toxaster elegans..... 233
texanus..... 233
Toxoglossa..... 134

Page.

Trachycardium 90
Trachyceras 110, 239
judicaricum 110, 239
var. subasperum .. 110
whitneyi 110, 239
Trachyceratidæ 110, **239**
Trachydomia 46
Trachytriton 49, 102
vinculum 49, 102
Trapezium 260, 262
bellefourchensis **260**, 262
micronema **76**, 143
subequalis **260**, 262
truncatum 143
Trematis 126, 129
pannulus **126**, 129
Trematocrinus 23, 42
fiscellus **23**
Trematodiscus **27**, 42, 104
Trematospira 57, 193
? imbricata **57**
infrequens **193**
Triarthrus becki 187
Trichopteris **231**
filamentosa **231**
gracilis **231**
Trigonarca 98, 267
(Breviarca) exigua 98
? salinæensis 98
? siouxensis 98
cuneiformis 267
transversa 267
Trigonatæ 34
Trigonella 100
Trigonellites 35
Trigonia ... 30, 33, 92, 133, 164, 207, 209, 218, 236, 268
alta **207**
americana 164
cerulea **268**
conradi **22**, 23
crenulata 235
cuneiformis **207**
distans **210**
emoryi 218
eufaulensis 268
evansana **17**
evansi 92
lorentii **227**
montanaensis 164
mortoni **268**
pandicosta **30**
quadrangularis **236**
texana **218**
syriaca **207**, 209
Trigoniidæ 30, 32, 33, 111, 132, 133, 268
Trigonotreta 51, 57, 58, 89
Trilobita 31, 39, 90, 179, 260, 261
Trilobites 28, 148, 149, 249
Trimerella 80
grandis 80
ohioensis 80
Triplesia 80, 190
calcifera 190
ortoni 80
Triton 216

Page.

Tritonidæ 102
Tritonidea 103
Tritonifusus migrans 50
? tennilineatus 49
Tritonium diegoensis 222
Trochactæon 29
Trochactæonina 29
Trochidæ 102, 180, 264
Trochita 212, 214, 217
antiqua **67**
carbonaria **40**
costellata **217**
diegoana **212**, 214
trochiformis 221
Trochoceras 39, 79
baeri **39**, 79
Trochonema 55, 80
tricarinata **67**, 80
umbilicata 55
Trochus 180
lenticularis ? 248
(Oxystele) euryostomus **180**
Tropidina 35, 107
Tropidiscus 106
Tropidocardium 99
Tropidoleptus 58
carinatus 58
Tuba ? bella 48
Tubicola 35, 105, 135
Tubipora lamellosa **247**
Tubulostium dickhauti 157
Tudicola ? dakotensis 49
(Pyropsis) bairdi 49
Tulotoma 138, 162
thompsoni **138**, 162, 169
Turbinolia 218
goldfussii 220
stokesii 220
texana **218**
Turbo 227, 258
glabra 50
guadalupensis **258**
helicinus ? 258
lineatus 221
mudgeanus **70**
nebrascensis **14**
paludinæformis **231**
tenuilineata 48
tenuilineatus **14**
texanus **258**
Turbonilla 134, 143
(Chemnitzia ?) coalvillensis **77**, 143
melanopsis 134
maclurii 220
Turnus 101, 137
(Goniochasma) stimpsoni 101
sphenoideus **137**
(Xylophagella) elegantulus 101
Turricula 103
Turrilites **49**
cheyennensis 49
(Helicoceras) cochleatus **18**
? umbilicatus **18**
Turris 103
minor 103

Sinuopallia .....
Sinum scopulosum .....
Siphonariidæ .....
? .....
Siphonida .....
Siphonostomata .....
Siphonotreta ? curta .....
Skenidium .....
devonicum .....
Smithia .....
hennahii .....
(Pachyphyllum) woodma
verrilli .....
Solariidæ .....
Solariorbis depressus .....
lineatus .....
nitens .....
Solarium .....
abyssinus .....
henrici .....
ornatum .....
pseudogranulatum .....
wallalense .....
Solecurtus ? ellipticus .....
(Psammobia ?) planulatus ...
Solemya 24, 8
bilix 153
(Janeia) vetusta .....
protexta .....
radiata 24
suplicata 99
ventricosa 205
Solemyidæ 99
Solen curtus 50
? dakotensis 18
diegoensis 220
irradians 48
parallelus 220

Page

Veniella elevata ... 269
goniophora ... **99**, 134
humilis ... 264
inflata ... 269
mortoni ... 99
rhomboidea ... 271
subovalis ... 268
subtumida ... 99
trapezoidea ... 269
trigona ... 269
(Venilicardia ?) humilis ... 99
Venielliidæ ... 264
Venilia ... 29, 99
gabbana ... 47
humilis ... 47
laphami ... 48
mortoni ... **29**
quadrata ... 47
subtumida ... 48
Venillicardia ... 99
Venus ... 207, 208, 217
——? ... 206
alveata ... 50
althleta ... 50
angustifrons ... 50, **206**
bisecta ... 50, **206**
brevilineata ... 50, 206
? circularis ... **16**, 48
floridana ... 220
indurata ... **207**
latilirata ... 50
lamellifera ... **206**
meekiana ... 48
ripleyana ... 48
pajaroana ... **217**
penita ... 220
perovalis ... **208**
securis ... **256**
(Trigonia) tantilla ... 50
unionides ... 49
vespertina ... **219**
syriaca ... **207**
Vermes ... 135, 138, 144, 158, 165
Vermetus rotula ... 49
Vestigia ... 129
Vetelletia (Ancylus) minuta ... **16**
Vetericardia ... 268
crenulirata ... 268
octolirata ... 268
Vitrina ... 106, 161
obliqua ... **17**, 169
? obliqua ... 106, 161
Vitrinidæ ... 106, 107
Vivipara ... 28
Viviparidæ ... 35, 107, 112, 135
Viviparus ... 35, 107, 112, 135, 137, 141, 162
?——? ... 136
conradi ... 107, 112, 162, 169
conesi ... **141**, 162, 168
gilli ... 35
gillianus ... 167
glaber ... 50
ionicus ... **136**, 170
leai ... 107, 162, 160

Page.

Viviparus leidyi ... 107, 162, 160
var. formosus ... 107, 169
paludinæformis ... 170
panguit-chensis ... **137**, 169
peculiaris ... 107, 162, 169
plicapressus ... **138**, 162, 169
prudentius ... 162, 169
prudentia ... 141
retusus ... 107, 162, 169
reynoldsana ... **28**
reynoldsianus ... 107, 162, 169
trochiformis ... 107, 135, 162, 169
var ... 135
wyomingensis ... **68**, 170
Volsella ... 33, 98, 111, 140, 158, 160, 164, 262
attenuata ... 47, 98
(Brachydontes) laticostata ... **140**, 160, 168
multilinigera ... 158
regularis ... **140**, 160, 168
concentrico-costellata ... 47
conradi ... 49
contracta ... 50
cretacea ... 47
ducatelli ... 50
formosa ... 33, 49
galpiniana ... 98
inflata ... 50
juliæ ... 47
meekii ... 47, 98
(Modiola) formosa ... 262
(Modiolina) platynota ... **164**
pedernalis ... 47
pertenuis ... 33, 49, 262
saffordi ... 47
scalprum var. isonema ... 111
[?] spinigera ... 50
subimbricata ... 164
Volutalithes ... 211, 219
Voluta[l]ithes ... 213
californiana ... **211**, 213
sayana ... 219
Volutilithes bella ... 48
biplicata ... 49
nasuto ... 49
Volviceramus ... 97
Vorticifex ... 112

W.

Waldheimia ... 121
compacta ... **120**, 121
Webateria ... 96
cretacea ... 96
Whitfieldia ... 193

X.

Xenophora ... 81
(Pseudophorus) antiqua ... 80
Xiphosura ... 46
Xylophaga elegantula ... **18**, 48
stimpsoni ... 18, 48
Xylophagella ... 48, 101
elegantula ... 48
Xyphosura ...
Xystracanthus arcuatus ...

Page.

Tellina occidentalis 243
occoyana..... **219**, 214
(Œne ?) subcitula..... 100
pedro..... **211**
pedroana..... 218
(Peronæa ?) equilateralis..... 100
scitula 100
plana..... 220
prouti **15**
scitula..... **15**
subelliptica..... **15**
subscitula **70**
subtortuosa..... **16**
syriaca..... **207**, 209
Tellinella 100
Tellinidæ 100, 111, 209
Tellinides 100
Tellinomya.....55, 79, 190
alta 55
contracta 190
? hamburgensis **190**
? obliqua 79
protensa **232**
ventricosa 55
Tellinula..... 100
Temnochilus.....65, 104
Tenea..... 209
pinguis 209
Tentaculites 39, 56, 138, 195
attenuatus 195
bellulus 195
gracilistriatus..... 195
hoyti..... **138**
oswegoensis **39**, 56
scalariformis 195
sterlingensis.....**39**, 56
tenuistriatus **39**, 56
Terebra 237
plicifera..... **237**
Terebratella..... 265
plicata..... 265
vanuxemi 265
Terebratula.....30, 73, 85, 130, 132, 146, 154, 162, 178, 196, 209, 218, 233, 235, 236, 257, 259, 265
—— ? 30, 206, 225
amygdala.....**223**, 225
augusta.....146, 162, **236**
bovens..... 85
bovidens.....73, 178
burlingtonensis..... **116**
choctawensis 218, **255**
(Dielasma) bovidens..... 132
burlingtonensis.... 130
elongata.....**223**, 225, 257
formosa..... 154
harlani 265
hastata 196
helena **259**
hermonensis **209**
humboldtensis 236
lachryma 222
leonensis..... **220**
marcyi..... 255
mexicana **233**
millepunctata.....20, **233**

Page.

Terebratula mormonii..... **243**
nitens.....49, **206**
perinflata **257**
plano-sulcata 243
rocky montana..... **243**
royssii..... 243
semisimplex.....**146**, 162
subtilita ... **232**, 233, 243, 253, 255, 274
uta **243**
utah **235**
waccensis..... 218
wilmingtonensis 220
Terebratulidæ 30, 121, 132, 265
Terebratulina atlantica..... 265
floridana..... 265
lachryma..... 265
Terebrispira 103
Teredidæ 101, 270, 272
Teredo..... .....101, 270, 272
emacerata..... **272**
globosa.....**18**, 101
irregularis 270
selliformis **21**, 101
substriata..... 206
tibialis..... 270
Tessarolax 158
hitzii..... **158**
Testacea 206
Tetrabranchiata 33, 35, 103, 132, 135, 263, 265
Tetradecapoda.....30, 46, 61, 90
Teuthidæ 105
Textularia phyllodes..... 47
Thaleops ? 248
Thallogenes..... 128
Thaumastus 106, 161
limnæformis.....106, 161, 169
Theca..... 28, 31
gregaria 31
lanceolata 26
(Pugiunculus) gregarea **28**
Thecia ramosa 192
Thecosmata..... 31
Thetis 100, 264
? circularis.....100, 264
Thracia.34, 92, 100, 151, 158, 215, 216, 259, 261, 262, 264
? arcuata..... **21**, 34
(Corimya) grinnelli **259**
gracilis 100
mactropis..... **215**, 216
myæformis **151**, 158
? occidentalis **17**, 92
? prouti 101
subgracilis **261**, 264
? sublevis.....**21**, 34, 262
? subtortuosa 100
subtruncata **17**, 92
trapezoides **205**
Thyatira [?] bisecta..... 50
Tiara humerosa 221
Tinoporus (Orbitolina) texanus 47
Tornatella elliptica 50
Tornatellæa impressa..... 220
Toxaster elegans..... 233
texanus 233
Toxoglossa 134

Page.

Trachycardium 90
Trachyceras 110, 239
judicaricum 110, 239
var. subasperum .. 110
whitneyi 110, 239
Trachyceratidæ 110, **239**
Trachydomia 46
Trachytriton 49, 102
vinculum 49, 102
Trapezium 260, 262
bellefourchensis **260**, 262
micronema **76**, 143
subequalis **260**, 262
truncatum 143
Trematis 126, 129
pannulus **126**, 129
Trematocrinus 23, 42
fiscellus **23**
Trematodiscus **27**, 42, 104
Trematospira 57, 193
? imbricata **57**
infrequens **193**
Triarthrus becki 187
Trichopteris **231**
filamentosa **231**
gracilis **231**
Trigonarca **98**, 267
(Breviarca) exigua 98
? salinæensis 98
? siouxensis 98
cuneiformis 267
transversa 267
Trigonatæ 34
Trigonella 100
Trigonellites 35
Trigonia ... 30, 33, 92, 133, 164, 207, 209, 218, 236, 268
alta **207**
americana 164
cerulea **268**
conradi **22**, 23
crenulata 255
cuneiformis **207**
distans **210**
emoryi 218
eufaulensis 268
evansana **17**
evansi 92
lorentii **227**
montanaensis 164
mortoni **268**
pandicosta **30**
quadrangularis **236**
texana **218**
syriaca **207**, 209
Trigonidæ 30, 32, 33, 111, 132, 133, 268
Trigonotreta 31, 57, 58, 89
Trilobita 31, 39, 90, 179, 260, 261
Trilobites 28, 148, 149, 249
Trimerella 80
grandis 80
ohioensis 80
Triplesia 80, 190
calcifera 190
ortoni 80
Triton 216

Page.

Tritonidæ 102
Tritonidea 103
Tritonifusus migrans 50
? tennilineatus 49
Tritonium diegoensis 222
Trochactæon 29
Trochactæonina 29
Trochidæ 102, 180, 264
Trochita 212, 214, 217
antiqua **67**
carbonaria **40**
costellata **217**
diegoana **212**, 214
trochiformis 221
Trochoceras 39, 79
baeri **39**, 79
Trochonema 55, 80
tricarinata **67**, 80
umbilicata 55
Trochus 180
lenticularis ? 248
(Oxystele) euryostomus **180**
Tropidina 35, 107
Tropidiscus 106
Tropidocardium 99
Tropidoleptus 58
carinatus 58
Tuba ? bella 48
Tubicola 35, 105, 135
Tubipora lamellosa **247**
Tubulostium dickhauti 157
Tudicola ? dakotensis 49
(Pyropsis) bairdi 49
Tulotoma 138, 162
thompsoni **138**, 162, 169
Turbinella 218
goldfussii 220
stokesii 220
texana **218**
Turbo 227, 258
glabra 50
guadalupensis **258**
helicinus ? 258
lineatus 221
mudgeanus **70**
nebrascensis **14**
paludinæformis **231**
tenuilineata 48
tenuilineatus **14**
texanus **258**
Turbonilla 134, 143
(Chemnitzia ?) coalvillensis **77**, 143
melanopsis 134
macluri 220
Turnus 101, 137
(Goniochasma) stimpsoni 101
sphenoideus **137**
(Xylophagella) elegantulus 101
Turricula 103
Turrilites **49**
cheyennensis 49
(Helicoceras) cochleatus **18**
? umbilicatus **18**
Turris 103
minor 103

Page.

Carboniferous fossils.....19, 22, 24, 29, 40, 59, 66, 70, 71, 92, 94, 109, 117, 118, 136, 144, 146, 147, 150, 151, 163, 164, 167, 175, 189, 196, 233, 241, 246, 255, 258
(lower) 147
fossils 81, 91, 116, 235, 243
Ostreidæ 172
shells 223
(upper) 147
Caroll, Montana 256
Catalogue 210
Cat, domestic instinct in 175
Cedar Bluff 71
Cenozoic 135, 140, 153
Unionidæ 140
Central Pacific Railroad line fossils 253
Cerebro spinal meningitis 119
Cephalopodes cretaceos 181
Chalk, organic remains of 208
Chazy fossils 231
limestone fossils 186
Check list of fossils, Eocene and Oligocene. 220
Chemung 13, 116
Chester group fossils 44, 84
Chippewa land district fossils 248
Chouteau limestone 75
Chutes River, Oregon 229
Cincinnati group 37, 68, 69
fossils 55, 77
Claiborne 205
Clinton fossils 80
group fossils 232
Coal beds 273
measures ...17, 36, 50, 53, 61, 75, 88, 121, 149, 155
of Europe 128
fossils..45, 85, 90, 92, 121, 177, 235, 256
(upper) 19
United States 128
Coalville, Utah 76, 145
Coast Range 244
Collett, John 148, 154, 174, 177
Colorado 128, 136, 141, 145, 146, 153, 157, 159, 244
River 188
(Eastern) 156
group 145
(Northwestern) 142
of the West 246
Commissioner of Agriculture 156
Common schools 124
Conchiferos cretaceos 181
Cone in cone 122
Conrad, T. A., writings of 205
Contents, table of 5
Cook, G. H 265
Cooper marble 75
Cope, E. D 139, 171, 222
Corniferous fossils 80
group fossils 57
Cretaceous 13, 14, 15, 16, 17, 20, 35, 47, 76, 96, 108, 123, 125, 127, 128, 133, 150, 151, 152, 156, 176, 259, 265
corals 146
eastern limit in Iowa 125
(European) 27, 96

Page.

Cretaceous fossils ..21, 22, 23, 27, 28, 66, 70, 71, 76, 92, 93, 95, 96, 111, 136, 142, 145, 147, 157, 158, 167, 180, 214, 218, 220, 222, 233, 243, 255, 256, 260, 263
invertebrates 181
Iowa 120
(lower) 19
ostreidæ 172
Crow Creek, Colorado 145
Croxton, Mr 71
Cyathophycus, nature of 187

D.

Dakota 123, 157, 176, 259, 261
group 96, 120
(Northwestern) 171
Dall, W. H 176
Dana, J. D 242
writings of 222
Danforth Hills, Colorado 145
Dead Sea 206
Deer Creek coal field 188
Denison, Texas 146
Devonian ...13, 38, 41, 54, 66, 77, 116, 123, 155, 174, 176
fossils..22, 57, 65, 94, 108, 118, 148, 167, 189, 192, 225
Dodd's ranch, Utah 145
Drift 75, 120, 122
(glacial) 171, 176
Dry Creek (Mexico), Cretaceous fossils 218
Dutton, C. E 174

E.

Echinodermes cretaceos 181
Echo Cañon 76
Economic geology 75
Economic geology of Moniteau County Missouri 13
Ehrenberg, C. G., writings of 229
El Paso 241, 242
Cretaceous fossils 218
Emory, Major 214
Encrinital limestone 13, 75
Engelman, H 256
Eocene fossils 170, 205, 210, 212, 220
of Southern States 237
marls 265
fossils 271
ostreidæ 237
Etats-Unis 241
Eureka district, Palæontology of 188
Europe 141, 147
Evans, Colonel 88
Evans, John, and Shumard, B. F 255

F.

Fair Haven section 205
Far West 128
Fish house, New Jersey 272
Fœtal hydrocephalus 119
Forests 142
Forestry 166, 176
Fort Benton group 96
Clark 17
Collins, Colorado 145

Page.

Veniella elevata ... 269
goniophora ... **99**, 134
humilis ... 264
inflata ... 269
mortoni ... 99
rhomboidea ... 271
subovalis ... 268
subtumida ... 99
trapezoidea ... 269
trigona ... 269
(Venilicardia ?) humilis ... 99
Venielliidæ ... 264
Venilia ... 29, 99
gabbana ... 47
humilis ... 47
laphami ... 48
mortoni ... **29**
quadrata ... 47
subtumida ... 48
Venilicardia ... 99
Venus ... 207, 208, 217
——? ... 206
alveata ... 50
althleta ... 50
angustifrons ... 50, **206**
bisecta ... 50, **206**
brevilineata ... 50, 206
? circularis ... **16**, 48
floridana ... 220
indurata ... **207**
latilirata ... 50
lamellifera ... **206**
meekiana ... 48
ripleyana ... 48
pajaroana ... **217**
penita ... 220
perovalis ... **208**
securis ... **256**
(Trigonia) tantilla ... 50
unionides ... 49
vespertina ... **219**
syriaca ... **207**
Vermes ... 135, 138, 144, 158, 165
Vermetus rotula ... 49
Vestigia ... 129
Vetelletia (Ancylus) minuta ... **16**
Vetericardia ... 268
crenulirata ... 268
octolirata ... 268
Vitrina ... 106, 161
obliqua ... **17**, 169
? obliqua ... 106, 161
Vitrinidæ ... 106, 107
Vivipara ... 28
Viviparidæ ... 35, 107, 112, 135
Viviparus ... 35, 107, 112, 135, 137, 141, 162
?——? ... 136
conradi ... 107, 112, 162, 169
conesi ... **141**, 162, 168
gilli ... 35
gillianus ... 167
glaber ... 50
ionicus ... **136**, 170
leai ... 107, 162, 169

Page.

Viviparus leidyi ... 107, 162, 169
var. formosus ... 107, 169
paludinæformis ... 170
panguit-chensis ... **137**, 169
peculiaris ... 107, 162, 169
plicapressus ... **138**, 162, 169
prudentius ... 162, 169
prudentia ... 141
retusus ... 107, 162, 169
reynoldsana ... **28**
reynoldsianus ... 107, 162, 169
trochiformis ... 107, 135, 162, 169
var ... 135
wyomingensis ... **68**, 170
Volsella ... 33, 98, 111, 140, 158, 160, 164, 262
attenuata ... 47, 98
(Brachydontes) laticostata ... **140**, 160, 168
multilinigera ... 158
regularis ... **140**, 160, 168
concentrico-costellata ... 47
conradi ... 49
contracta ... 50
cretacea ... 47
ducatelli ... 50
formosa ... 33, 49
galpiniana ... 98
inflata ... 50
juliæ ... 47
meekii ... 47, 98
(Modiola) formosa ... 262
(Modiolina) platynota ... **164**
pedernalis ... 47
pertenuis ... 33, 49, 262
saffordi ... 47
scalprum var. isonema ... 111
[?] spinigera ... 50
subimbricata ... 164
Volutalithes ... 211, 219
Voluta[l]ithes ... 213
californiana ... **211**, 213
sayana ... 219
Volutilithes bella ... 48
biplicata ... 49
nasuto ... 49
Volviceramus ... 97
Vorticifex ... 112

W.

Waldheimia ... 121
compacta ... **120**, 121
Webseteria ... 96
cretacea ... 96
Whitfieldia ... 193

X.

Xenophora ... 81
(Pseudophorus) antiqua ... 80
Xiphosura ... 46
Xylophaga elegantula ... **18**, 48
stimpsoni ... 18, 48
Xylophagella ... 48, 101
elegantula ... 48
Xyphosura ... 36
Xystracanthus arcuatus ... 20

Page.

Rensselleria 57, 63
conradi 57
lævis 63
Requienia 176
patagiata 176
texana 176
Retepora archimedes 248
indianensis 248
Retzia 30, 72, 79, 116, 131, 147, 163, 178, 196, 257
acambonia 119
(Ambona?) altirostris 119
compressa 30
? meekana 256
meekiana 257
mermonii 20, 52, 131, 178
papillata 256, 257
punctulifera 73
radialis 196
sexplicata 116
(Trematospira) granulifera 68, 79
woosteri 147, 163
Rhaphonelis foliacea 229
lanceolata 229
oregonica 229
Rhiphidoglossa 102, 132, 133, 134
Rhiphidoglossata 32, 34
Rhizopoda 31, 129, 131, 190
Rhodea 106
Rhodocrinus 59, 150, 163
nanus 40, 59
vesperalis 150, 163
Rhombopora 71, 131
lepidodendroides 71, 131
Rhynchonella 24, 30, 41, 57, 59, 72, 78, 80, 85, 116, 118, 126, 127, 130, 131, 148, 163, 165, 177, 193, 196, 235, 236, 245, 257, 262
—— ? 30, 33, 36, 62, 257, 274
angulata 52
argenturbica 126, 130
capax 78, 148
caput testudinus 118
carolina 80
castanea 62, 193
dentata 78, 148
duplicata 193
emmonsi 193, 235
endlichi 88, 163
eurekensis 196
gnathophora 30, 236
guadalupæ 256, 257
horsfordi 193
indentata 257
(Leiorhynchus) laura 193
nevadensis 193
sinuatus 193
metallica 127, 131
missouriensis 41, 59
myrina 236, 262
neglecta 80
var. scobina 70
nitens 49
? occidens 193
opposita 116
osagenensis 72, 85
ottumwa 118, 165

Page.

Rhynchonella pugnus 193
pustulosa 116, 235
rockymontana 121
speciosa 57
subtrigona 24
tennesseensis 148
tethys 193
texana 257
thera 196
uta 20, 52, 131, 177, 245
wasatchensis 127, 131
wilmingtonensis 229
Rhynchonellidæ 30, 33, 62, 108, 109, 131, 262
Rhytophorus 95, 112, 137, 161
meekii 137, 161, 166
priscus 95, 112, 161, 166
Rimella curvilirata 48
Ringicula acutispira 48
biplicata 221
pulchella 48
subpellucida 48
Ringiculidæ 101
Ringiculinæ 29
Ringinella subpellucida 48
Rissoidæ 106
Rostellaria? 219
americana 48, 256
biangulata 14, 48
? collina 219
(texana) 219
fusiformis 13
indurata 206
nebrascensis 48, 274
rostrata 48
Rostellites 214, 219
bellus 48
biplicatus 49
conradi 49
nasutus 49
texana 219
texanus 214
Rostrifera 35
Rotella 152
nana 221
verruculifera 152
Rotundaria 105

S.

Saccocrinus 56
christyi 56
Sagenella 187
ambigua 187
Sanguinolaria 259
oblata 259
Sanguinolites 68, 80, 89, 194, 197
æolus 89, 197
? combensis 194
? gracilis 194
? mænia 197
obliquus 66
? obliquus 80
(Promacrus) missouriensis 66
nasutus 66
rigidus 194

Page.

Sanguinolites retusus **197**
salteri **197**
sanduskyensis **66**, 80
? sanduskyensis 194
simplex **197**
striatus **197**
Sanguinolites ventricosus 194
Sarcinula 223
costata 247
? obsoleta **232**
(Porites ?) glabra **247**
Saxicava 211, 213, 260, 263
abrupta **211**, 213
jurassica **260**, 263
Saxicavidæ 101, 269, 271
Scala forshayii 48
Scalaria 205, 237
cerethiformis **14**
expansa **205**
forshayii 48
texana 48
unilineata **237**
Scalpellum inequicostatum 48
Scambula 268
perplana 268
Scaphiocrinus 26, 43, 60, 72, 82, 83, 84, 85, 91, 117, 144, 149, 165
clio 82
delicatus 82
depressus **64**
fiscellus 82
gibsoni **144**, 149, 165
gurleyi **144**, 149, 165
? hemisphæricus 72
juvenis 82
macrodactylus 82
nanus 82
notabilis 82
penicillus 82
rudis 82
rusticellus **117**
scalaris 82
striatus 82
tethys 82
(Zeacrinus) asper 82
lyra 82
scobina 82
serratus 82
Scaphites 28, 104, 135, 250, 265
(Ammonites ?) comprimus **250**
nodosus **250**
(Discoscaphites) abyssinus 104
cheyennensis 104
conradi 104
var. gulosus. 104
conradi var. intermedius 104
mandanensis ... 104
nicoletii 104
larvæformis **19**, 104
mandanensis 274
nicolleti 274
nodosus 265
var. brevis 104, 265

Page.

Scaphites nodosus var. plenus 21, 104
quadrangularis 104, 265
ventricosus **28**, 104
vermiculus 159
vermiformis **28**, 104
warreni 104, 135, 265
wyomingensis 265
Scaphitidæ 104, 135, 265
Scaphoides 33
Scenella 189
? conula **189**
Schænaster 44, 60
fimbriatus 44
wachsmuthi **40**, 60
Schizambon **190**
typicalis **190**
Schizocrinus nodosus ? 231
Schizodesma 100
Schizodus 24, 32, 44, 45, 73, 86, 89, 132, 178, 194, 197
—— ? 45
amplus **64**, 86
chesterensis **24**, 44
cuneatus 90, 197
curtiforme **197**
curtus **41**, 73, 86
(Cytherodon) orbicularis **194**
deparcus **197**
medinaensis **67**, 89
obscurus 51
ovatus 32
(Prisconia) perelegans 86
rossicus 51, 52, 87
subtrigonalis **67**
pintoensis **197**
wheeleri 73, 132, 178
Schizopyga 215, **216**
californiana **215, 216**
Schizothærus 211, 213
nutalli **211**, 213
traskei **211**
Schoenaster 24
Scoliostoma 195
americana **195**
Scorpio carbenarius **53**
Scutella 205
aberti **205**
crustuloides 222
jonesii 222
lyelli 220
pileus-sinensis 222
rogersi 222
Seacrinus (Prisconais) perelegans **64**
Sedidæ 98
Sedgewickia 32, 38, 61, 79, 236
altirostrata 32
concava 32, 236
? compressa **68**, 79
? fragilis **68**, 79
(Grammysia ?) neglecta **68**, 79
(Sanguinolites) ? subarcuata .. 38, 61
topekaensis 32
Semicassis sowerbii 221
Seila 102
Septopora cestriensis 87
Septastrea ? sexradiata 46

Page.

Serpula 35, 105, 135, 144, 165
insita **144**, 165
intrica **135**
(Spirorbis) planorbites 51
? tenuicarinata 105
? tenuicarinatus **17**
Serpulidæ 35, 105, 135
Serrifusus 103
Sigaretus scopulosum 50
scopulosus **206**
Siliqua 270
cretacea 270
Sinistralia 103
Sinuopallia 264, 269
Sinum scopulosum 50
Siphonariidæ 102, 112
? 264
Siphonida 268
Siphonostomata 264
Siphonotreta ? curta **225**
Skenidium 192
devonicum **192**
Smithia 62, 108
hennahii 108
(Pachyphyllum) woodmani 123
verrilli **62**
Solariidæ 108, 180
Solariorbis depressus 221
lineatus 221
nitens 221
Solarium 180
abyssinus 48
henrici 221
ornatum 221
pseudogranulatum 221
wallalense **180**
Solecurtus ? ellipticus 225
(Psammobia ?) planulatus 225
Solemya 24, 80, 99, 153
bilix **153**, 157
(Janeia) vetusta 80
protexta 50
radiata **24**
suplicata 99
ventricosa **205**
Solemyidæ 99
Solen curtus 50
? dakotensis **18**
diegoensis 220
irradians 48
parallelus 220
(Solecurtus ?) ellipticus **223**
planulatus **223**
subplicatus **15**
Solenidæ 101, 279
Soleniscus **25**, 46, 151, 178
brevis **151**
(Macrocheilus) fusiformis 175, 178
medialis 175, 178
newberryi 175, 178
paludinæformis 175, 178
ponderosus 175, 178
primigenius 175, 178
texanus 175, 178
ventricosus 175, 178

Page.

Soleniscus planus **151**, 175, 178
typicus **25**, 46, 175, 178
Solenocaris 90
Solenochilus 65, 104
Solenoconchæ 101, 132, 264
Solenoides **250**
lowensis **250**
Solenomya 45, 87, 90, 197
? ? anodontoides **90**
biarmica 50
curta **197**
(Janeia) vetusta **66**
radiata 45
Solenopsis 74
solenoides 74
Solidula biplicata 48
Solyma 269
lineolata 269
Spatangidæ 96
Sphæra 110
whitneyi **110**
Sphærella inflata 220
Sphærexochus 91
romingeri 91
Sphæriola 99, 260, 264, 269
? cordata 99
? endotrachys 99
? obliqua **88**
transversa **260**, 264
umbonata **269**
? warrenana 99
Sphærium 105, 112, 135, 160
——? 135
formosum 105, 160, 168
idahoense **65**, 112, 166, 170
planum **21**, 105, 160, 168
recticardinale **21**, 105, 160, 168
rugosum **65**, 112, 166, 170
subellipticum 105, 160, 168
Sphærocrinus **37**
Sphenodiscus 104
Sphenophyllum 155
Sphenophyllum emarginatum 155
schlotheimi 155
Sphenopteris 149, 246
acuta 149
fremonti **231**
lobifolia 226
paucifolia **231**
triloba 231
trifoliata **231**
Sphenopoterium **24**, 41, 43
compressum **24**, 43
cuneatum **24**, 43
enorme **24**, 41
var. depressum 41
obtusum **24**, 43
Spherocoryphe 185
robustus **185**
Spiractæon 29
Spiraxis 221
Spirifer 30, 31, 41, 44, 57, 58, 61, 62, 73, 89, 90, 91, 92, 94, 108, 109, 116, 118, 127, 130, 131, 148, 149, 155, 163, 165, 178, 225, 239, 245, 253, 257
——? 20, 36, 255

Page.

Spirifer acuminata 149
agelaius 163
annectans **196**
cameratus 20, 52, 73, 85, 94, 131, 149, 178, 233, 245, 246, 257
carteri 89
cedarensis 250
centronatus 130
compactus **62**
cupidatus 109
darwinii 225
desiderata **196**
duodecicostatus 225
englemanni 57, 94, 108
euritines 149, 250
extenuatus 130
fastigatus **64**, 91
formacula 58
fultonensis 85
glaber 225
var. contracta **26**
glans cerasus **118**
gregaria 149
guadalupensis 257
hemicyclus **57**
hemiplicata 20, **232**
hirtus **116**
inequicostatis **250**
iowensis **250**
kentuckensis 20, 233, 274
kennicotti **62**
keokuk 92
laminosus 52
leidyi 196
ligus **250**
lineatus 20, 233, 243, 245
(Martinia) cooperensis 41
franklinii **63**
glaber var. contracta ...44, 127, 131
lineatus 30, 155, 178
maia 198
meristoides **63**
peculiaris 130
plano convexa 178, 274
plano convexus 31, 73, 131
richardsoni **63**
sublineatus **63**
undifera 193
mousebachanus 274
mexicanus **256**, 257
moosak paliensis 52
neglecta 196
neglectus 91
octoplicata? 232
paradoxus 58
perextensus **58**
perlamellosus 57
pennatus **250**
planoconvexa 20, 274
propinquus 61
radiata 148
rocky-montani **243**, 245
rocky montanus 131
solidirostris **116**

Page.

Spirifer sphalæna **225**
(Spiriferina) cristata 196
scobina 94
pulcher 94
striatus 130, 131, 243
var. triplicatus 243
strigosus 94
subcardiiformis 165
suborbicularis 91
subundiferus **58**
sulcifera **256**, 257
textus 140
trigonalis 196
(Trigonotreta) argentarius **166**
biplicatus 89
cameratus 109
opinus 90
pifionensis **65**, 108
scobina 109
striatiformis 89
strigosus 108
texanus **68**
? texanus 246
triplicata **232**
utahensis 94, 108
vespertilia 225
Spirifera 193, 196, 235
——? 193, 235
alba-pinensis **235**
centronata 235
disjuncta 193
engelmanni **22**, 193
macra **22**
(Martinia) glabra 193
var. nevadensis. 193
norwoodi **22**
parryana 193
pifionensis 319
pulchra **22**
raricosta 193
scobina **22**
setigera 235
(Speriferina?) alia **236**
striata 235
varicosa 193
Spiriferidæ 31, 62, 108, 109
Spiriferina 30, 73, 109, 118, 127, 131, 178, 196, 236, 257
——? 30, 109
billingsii **256**, 257
homfrayi? 236
kentuckensis 52, 73, 131, 178
(Martinia) glabra 193
octoplicata 131
pulchra 109
spinosa var. campestris 127
subtexta **119**
Spirigera 127, 130, 132
Spirigera —— ? 20
monticola **127**, 130
obmaxima 130
planosulcata 132
subtilita 20, 132
Spironema 48, 103
belia 48

Page.

Spironema tenuilineata 48, 103
Spirorbis 106, 153
? dickhauti 153
helix 51
Spirulæa rotula 49
Spondylidæ 266
Spondylus 217, 266
dumosus 222
echinatus 47
estrallensis 215
estrellanus 217
gregalis 266
Spongiæ 41, 43, 56, 58, 91
Spongiolites 203
Spongolithis acicularis 229
aspera 229
fustis 229
mesogonyla 229
Stagnicola 106
Stralagmium concentricum 220
Stauronels balleyi 229
semen 229
Stavelia 98
Steganocrinus 40, 42, 59
araneolus 42
pentagonus 42, 59
sculptus 42
Stephanodiscus —— ? 203
Stenaster 78
grandis 69, 78
Stenophora columnaris 52
Stenotheca 189
acadica 198
elongata 189
Stramonita 212, 214
petrosa 212, 214
Straparollus 25, 26, 30, 42, 44, 46, 74, 87, 195, 258
—— ? 258
Straparollus cornudanus 258
(Euomphalus) minnesotensis ... 250
pernodosus 65, 87
rugosus 74
subquadratus ... 65, 87
subrugosus 87
lens 42
newarkensis 195
planidorsatus 44
similis 26, 44
var. planus 26, 44
umbilicatus 46
Streblopteria 45, 196
similis 196
? tenuilineata 45
Strephona 212, 214
pedroana 212, 214
Strepsidura 237
conybearii 222
Streptacis 86
whitfieldi 67, 86
Streptelasma 155
corniculum 155
Streptorhynchus .. 116, 119, 177, 190, 192, 235, 245, 257
chemungensis 192
equivalvis 235
inflatus 116, 235

Page.

Streptorhynchus lens 119
minor 190
occidentalis 245
(Orthisimia) shumardianus 257
pyramidalis 245
umbraculum 245
Striarca 98
Striatopora 56, 119, 156
carbonari 119
linnæana 156
missouriensis 56
Stricklandinia 57, 91, 125
castellana 138
davidsoni 152
deformis 64, 91
elongata var curta 57
Stricklandinia salteri 152
Strobilocystites 138
calvini 138
Stromatopora 156, 192
Strombus 208
pervetus 208
pustulifera 156
Stromomena rhomboidalis 130
Strophalosia 257
(Anlosteges) guadalupensis ... 257
Strophodonta 148, 192, 235, 250
arcuata 192
beckii 36
canace 225
calvini 192
? costata 250
demissa 148, 192
headleyana 36
inequiradiata 192
iowensis 250
parva 250
patersoni 192
perplana 192
punctulifera 192
Strophites grandæva 167
Strophomena 56, 57, 58, 62, 78, 89, 126, 129, 130
148, 190, 192, 234, 235, 248
alternata 148
angulata ? 248
convexa 247
deltoidea 248
filitexta 130
Fontinalis 126, 129
(Hemopronites) crenistria 89
filitexta 78
nutans 78
plano-convexa 78
planumbona .. 78
plicata 78
sinuata 78
sulcata 78
nemea 190, 234
nasuta ? 248
planumbona 148
rhomboidalis 36, 58, 78, 192, 235
serica ? 248
(Strophodonta) 58
cavumbona ... 57
demissa 62

Page.

Strophomena (Strophodonta) subdemissa .. 62
unicostata **56**
Strophomenidæ 31, 62, 108, 109
Strophostylus 57
cancellatus **57**
Strotocrinus **40**, 42, 81
? asperrimus 81
ectypus 81
liratus 81
perumbrosus 42, 81
(Physetocrinus ?) asper 81
dilatatus 81
regalis 42
Stylioia 195
fissurella 195
fissurella var. intermittens 195
Subulites 56, 91
inflatus **65**, 91
(Polyphemopsis) brevis 56
Succinea 137, 159
(Brachyspira) papillispira 159, 170
papillispira **137**
Sureula 103
beaumontii 222
cælata 222
childreni 222
desmoyersii 222
kellogii 222
monilifera 222
nodocarinata 222
obliqua 222
sayi 222
varicostata 222
Sureulites 103
Surirella bifrons 229
plicata 229
Surirella 203
campylodiscus 203
splendida 203
Sycotypus 212, 214
ocobanus 214
ocoyanus 50, **212**
penitus 214
Symphysurus 101
? goldfussi **191**
Synbathocrinus 53, 63, 81, 82, 91
brevis **63**, 82
dentatus **249**, 251
robustus 91
wachsmuthi **40**, 63, 82
Syncyclonema 47, 97, 263
? rigida 47, 97, 263
Synedra spendida 229
ulna 229
Synocladia 72, 90, 131, 178
Syphonia biserialis 19, 52, 72, 90, 131, 178
piriformis ? 247
virgulacea 52
var. biserialis 87
Syntrielasma 45, 72, 85, 177
hemiplicata 45, 72, 85, 177
Syringopora 36, 72, 108, 109, 130, 131, 156
—— ? 109
harveyi **119**, 130
hisingeri 192

Page.

Syringopora lineata ? 247
maclurei 156
multattenuata 72, 131
perelegans 156, 192
Syringothyris 196
cuspidata 196

T.

Tænioglossa 132, 135
Tæniopteris elegans **246**
glossopteroides **246**
magnifolia 246
Tamiosoma **215**, 216
gregaria **215, 216**
Tancredia 34, 99, 143, 164, 262
? æquilateralis **21**, 34
americana 99
bulbosa **260**, 262
? cælionotus **143**
corbuliformis **260**, 262
extensa 164
? inornata 262
postica **260**, 262
warrenana **21**, 34, 262
Tancrediidæ 34, 99, 262
Taonurus 155
colletti 155
Tapes 158, 211, 213, 215, 216, 217, 259
—— ? 217
diversum **211**, 213
hilgardi 158
inexensis **217**
lineatum **215**, 216
montana **217**
montanensis **259**
wyomingensis **70**
Taphius 34, 106
Taxocrinus 37, 44, 58, 60, 82, 149
gracilis **37**, 58
multibrachiatus var. colletti 149
semiovatus 44
thiemei 82, 87
Tectibranchiata 101, 264
Tectura ? occidentalis 48
Tecturidæ 134
Tellimera 269
eborea 269
Tellina 28, 100, 111, 207, 209, 211, 212, 213, 214
albaria **206**
(Arcopagia) ? cheyennensis 107
arctata **206**
bitruncata **206**
? cheyennensis **15**
congesta **211**, 213
dariena **212**, 214
diegoana **211**, 213
emacerata **206**
equilateralis **15**
? formosa **21**, 48
gracilis **15**
? isonema **111**
modesta **111**
nasuta **206**
nitidula **28**
obruta **207**

AUXILIARY COLLECTION

Stanford University Library
Stanford, California

In order that others may use this book, please return it as soon as possible, but not later than the date due.